Environnement Canada
Service de la protection de l'environnement

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Environmental Protection Service

Water Pollution Control Directorate Publications

Les publications de la Direction générale de la lutte contre la pollution des eaux

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WATER POLLUTION CONTROL DIRECTORATE PUBLICATIONS

PUBLICATIONS DE LA DIRECTION GÉNÉRALE DE LA LUTTE CONTRE LA POLLUTION DES EAUX

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WATER POLLUTION CONTROL DIRECTORATE PUBLICATIONS

As part of its technology transfer program, the Water Pollution Control Directorate publishes a series of technical reports, which are included in the ENVIRONMENTAL PROTECTION SERVICE (ENVIRONMENT CANADA) REPORT SERIES. The EPS series is divided into eight categories, with identifying code numbers and cover colours. These are described under the heading "Report Numbering System".

Also available from WPCD are copies of conference papers, speeches, and reprints of papers prepared for technical and scientific journals by the professional staff. These papers cover a number of the activities and projects in which the directorate participates, and provide information on its approaches to the control of water pollution in Canada.

Included in this list of publications are reports published jointly by Environment Canada and the Ontario Ministry of the Environment under the CANADA-ONTARIO AGREEMENT ON GREAT LAKES WATER QUALITY. These reports describe research projects funded by the Agreement's RESEARCH PROGRAM for the Abatement of Municipal Pollution. The projects have been either carried out in-house by Environment Canada and the Ontario Ministry of the Environment, or through contracts with municipalities, research institutions and industrial organizations.

Also included is the SCAT Series of research reports. These reports describe the results of research and development projects in the municipal and domestic wastewater collection, treatment and disposal fields. The projects have been developed through the Interdepartmental Committee on Sewage Collection and Treatment (SCAT Research Committee) and funded by the Canada Mortgage and Housing Corporation, with technical assistance provided by Environment Canada.

Unless otherwise indicated, these publications are available both as microfiche and in paper copy. Details on ordering procedures are included at the end of this publications listing.

PUBLICATIONS DE LA

DIRECTION GÉNÉRALE DE LA LUTTE CONTRE LA POLLUTION DES EAUX

Dans le cadre de son programme des applications technologiques la Direction générale de la lutte contre la pollution des eaux publie une série de rapports techniques qui paraissent dans la SÉRIE DE RAPPORTS DU SERVICE DE LA PROTECTION DE L'ENVIRONNEMENT (ENVIRONNEMENT CANADA). La série de rapports du SPE se divise en huit catégories, identifiées par des numéros de code et présentées sous des couvertures de différentes couleurs. Cette classification est décrite à la rubrique "Système de numérotage des rapports".

La Direction générale offre également des exemplaires de discours et d'articles de conférence, ainsi que des réimpressions de documents rédigés par le personnel professionnel à l'intention de journaux et revues techniques et scientifiques. Ces ouvrages traitent d'un certain nombre d'activités et de projets, auxquels participe la Direction générale, et donnent des renseignements sur la ligne de conduite de cette dernière en matière de lutte contre la pollution des eaux au Canada.

La liste des publications contient en outre des rapports publiés conjointement par Environnement Canada et le ministère de l'Environnement de l'Ontario, en vertu de l'Accord Canada-Ontario relatif à la qualité des eaux des Grands lacs. Ces rapports décrivent des projets de recherches financés dans le cadre de l'Accord pour la réduction de la pollution en milieu urbain. Certains de ces projets sont réalisés directement par Environnement Canada et le ministère ontarien de l'Environnement, tandis que d'autres le sont au moyen de contrats accordés à des municipalités, institutions de recherches et organismes industriels.

Également sont inclus les rapports de recherche de la série SCAT. Les rapports de cette série donnent les résultats de travaux de recherche et de développement dans les domaines de la collecte, du traitement et de l'évacuation des eaux usées municipales et domestiques, réalisés dans le cadre de projets élaborés par l'intermédiaire du Comité interministériel de la collecte et du traitement des eaux d'égoût (Comité SCAT) et financés par la Société centrale d'hypothèques et de logement, Environnement Canada assurant une assistance technique.

À moins d'indication contraire, ces publications sont disponibles sur microfiche et sur papier. Vous trouverez, à la fin de la liste des publications, les modalités de commande des documents.

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WATER POLLUTION CONTROL DIRECTORATE

REPORT NUMBERING SYSTEM

Sample Number: EPS 3-WP-74-2

'EPS' designates Environmental Protection Service.

'3' designates the report category, in this case Economic and Technical Review.

'WP' designates Water Pollution, i.e., those reports published by the Water Pollution Control Directorate.

'74' designates the year of publication.

'2' designates the number of the report published in the above category by the Water Pollution Control Directorate in the year 1974.

CATEGORY DESCRIPTIONS

EPS 1 Regulations, Codes and Protocols
(copper covers)

Describe current legislation and administrative approaches favoured by the Environmental Protection Service.

EPS 2 Policy and Planning
(white covers)

Describe the policies and plans relating to the Environmental Protection Service. These reports may be the results of studies in the private sector; joint studies between the private sector and EPS, or between federal and provincial governments; or, studies by the staff of EPS.

EPS 3 Economic and Technical Review
(green covers)

Relate to state-of-the-art reviews, library surveys, industrial inventories, and their associated recommendations where no experimental work is involved. These reports are undertaken either by an outside agency or by the staff of EPS.

EPS 4 Technology Development
(orange covers)

Describe technical apparatus and procedures, and results of laboratory, pilot plant, demonstration or equipment evaluation studies. Water Pollution Control Directorate publications in this category include descriptions of the development and demonstration activities of the Wastewater Technology Centre (WTC), Burlington, Ontario. The WTC is involved in bench and pilot scale studies in its laboratories, and also participates in field demonstration projects at industrial sites.

EPS 5 Surveillance Reports
(blue covers)

Present results of monitoring programs carried out by or for EPS.

EPS 6 Training Manuals
(gold covers)

Present information that is used primarily for training purposes.

EPS 7 Briefs and Submissions to Public Inquiries
(grey covers)

State the results of studies and investigations conducted in response to a public hearing or inquiry.

EPS 8 Environmental Impact and Assessment
(yellow covers)

Provide reviews of potential consequences posed by a project or undertaking. Reports on environmental emergencies are included in this category.

SERVICE DE LA PROTECTION DE L'ENVIRONNEMENT

DIRECTION GÉNÉRALE DE LA LUTTE CONTRE LA POLLUTION DES EAUX

SYSTÈME DE NUMÉROTAGE DES RAPPORTS

Exemple: EPS 3-WP-74-2

'EPS' désigne le Service de la protection de l'environnement.

'3' désigne la catégorie du rapport, notamment l'Analyse économique et technique.

'WP' désigne Pollution des eaux, c'est-à-dire les rapports publiés par la Direction générale de la pollution des eaux.

'74' désigne l'année de publication.

'2' indique le numéro du rapport publié par la Direction générale en 1974 dans la catégorie susmentionnée.

DESCRIPTIONS DES CATÉGORIES

EPS 1 Règlements, codes et méthodes d'analyse
(couvertures de couleur cuivre)

Décrivent les lignes de conduite législatives et administratives actuelles appuyées par le Service de la protection de l'environnement.

EPS 2 Politiques et planification
(couvertures blanches)

Décrivent les directives et les programmes concernant le Service de la protection de l'environnement. Ces rapports peuvent être le résultat d'études réalisées soit par le secteur privé seul, ou en collaboration avec le Service, ou exécutées par le personnel du SPE.

EPS 3 Analyse économique et technique
(couvertures vertes)

Ont rapport à l'état actuel des connaissances, aux études bibliographiques, aux inventaires industriels et aux recommandations connexes dans les domaines n'impliquant pas de travail expérimental. La réalisation de ces rapports est la responsabilité soit d'un organisme extérieur ou du personnel du SPE.

EPS 4 Technologie
(couvertures oranges)

Décrivent des appareils et des méthodes techniques ainsi que les résultats d'études d'évaluation de l'équipement en laboratoire et d'expériences de démonstration dans des usines pilotes. Les publications de la Direction générale de la pollution des eaux dans cette catégorie comprennent des descriptions de la recherche appliquée et des démonstrations du Centre technique des eaux usées à Burlington (Ontario); ce dernier effectue dans ses laboratoires des études à l'échelle banc-d'essai ainsi qu'à l'échelle pilote, et participe également à des démonstrations pratiques à des usines.

EPS 5 Rapports de surveillance
(couvertures bleues)

Font état des résultats obtenus grâce à des programmes de surveillance du SPE, ou pour le compte de ce dernier.

EPS 6 Guides de formation
(couvertures couleur or)

Donnent des renseignements utilisés surtout à des fins de formation.

EPS 7 Exposés et mémoires soumis à des enquêtes publiques
(couvertures grises)

Font état des résultats d'études et de recherches entreprises pour répondre aux besoins d'audiences ou d'enquêtes publiques.

EPS 8 Rapports sur les impacts environnementaux
(couvertures jaunes)

Fournissent une évaluation des répercussions possibles d'un projet ou d'une entreprise. Cette catégorie comprend aussi des rapports sur les urgences environnementales.

WATER POLLUTION CONTROL DIRECTORATE PUBLICATIONS

Titles are listed in the language of the publication. All reports carry a bilingual abstract. Unless otherwise indicated, these reports are available both as microfiche and paper copy.

PUBLICATIONS DE LA DIRECTION GÉNÉRALE DE LA LUTTE CONTRE LA POLLUTION DES EAUX

Les titres sont listés dans leur langues de publication. Tous les rapports sont accompagnés d'un résumé bilingue. À moins d'indication contraire, ces rapports sont disponibles sur microfiche et sur papier.

Regulations, Codes and Protocols

Règlements, codes et méthodes d'analyse

EPS 1-WP-72-1, (E/F)

Pulp and Paper Effluent Regulations, Ottawa, 1972.

Règlements sur les effluents des fabriques de pâtes et papiers, Ottawa, 1972.

EPS 1-WP-72-2, (E/F)

Guidelines for the Pulp and Paper Effluent Regulations, Ottawa, 1972.

Lignes directrices concernant le Règlement sur les effluents des fabriques de pâtes et papiers, Ottawa, 1972.

EPS 1-WP-74-1, (E/F)

Petroleum Refinery Effluent Regulations and Guidelines, Ottawa, 1974.

Règlement et Directives sur les effluents des raffineries de pétrole, Ottawa, 1974.

EPS 1-WP-75-1, (E/F)

Fish Processing Operations Liquid Effluent Guidelines, Ottawa, 1975.

Lignes directrices concernant l'effluent du traitement du poisson, Ottawa, 1975.

EPS 1-WP-76-1, (E/F)

Automated Method for the Determination of the Phosphorus Content in Detergents, prepared by Nancy L. Cathcart, Ontario Region, Environmental Protection Service, Ottawa, 1976.

Méthode automatisée pour déterminer la teneur en phosphore des détergents, préparé par Nancy L. Cathcart, Région de l'Ontario, Service de la protection de l'environnement, Ottawa, 1976.

EPS 1-WP-77-1, (E/F)

Metal Mining Liquid Effluent Regulations and Guidelines, Ottawa, 1977.

Règlements et directives sur les effluents liquides des mines de métaux, Ottawa, 1977.

EPS 1-WP-77-2, (E/F)

Meat and Poultry Products Plant Liquid Effluent Regulations and Guidelines, Ottawa, 1977.

Règlement et directives sur les effluents liquides de l'industrie de la viande et de la volaille, Ottawa, 1977.

EPS 1-WP-77-3, (E/F)

Chlor-Alkali Mercury Regulations, Ottawa, 1977.

Règlement sur le mercure provenant des fabriques de chlore et de soude caustique, Ottawa, 1977.

EPS 1-WP-77-4, (E/F)

Potato Processing Plant Liquid Regulations and Guidelines, Ottawa, 1977.

Règlement et lignes directrices sur les effluents des établissement de transformation de la pomme de terre, Ottawa, 1977.

EPS 1-WP-77-5, (E/F)

Metal Finishing Liquid Effluent Guidelines, Ottawa, 1977.

Lignes directrices concernant le contrôle des effluents de traitements de surface, Ottawa, 1977.

EPS 1-WP-80-1, (E/F)

Standard Procedure for Testing the Acute Lethality of Liquid Effluents, Water Pollution Control Directorate, Ottawa, 1980.

Méthode normalisée de contrôle de la toxicité aiguë des effluents, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980.

Policy and Planning — **Politiques et planification**

EPS 2-WP-74-1,

Interim Guidelines for Wastewater Disposal in Northern Canadian Communities, Environmental Protection Service, Ottawa, 1974. 10 p.

Guidelines prepared as a basis for establishing the policy of Environment Canada with respect to the implementation of a program of water pollution abatement in communities in arctic and subarctic regions of Canada.

EPS 2-WP-74-1F,

Épuration et évacuation des eaux usées dans les agglomérations du Nord canadien - Directives provisoires, Service de la protection de l'environnement, Ottawa, 1976. 10 p.

Lignes directrices préparées afin de servir de base à la politique d'Environnement Canada en ce qui a trait à l'implantation d'un programme de lutte contre la pollution de l'eau dans les agglomérations des régions arctiques et subarctiques.

Economic and Technical Review **Analyse économique et technique**

EPS 3-WP-72-1, Annotated Bibliography of Farm Animal Wastes, by J.B. McQuitty and E.M. Barber, University of Alberta, for the Water Pollution Control Directorate, Ottawa, 1972. 892 p.

EPS 3-WP-72-2*, Sulfite Pulping Spent Liquor Recovery and Effluent Treatment, by Ekono Consulting Engineers, Seattle, Washington, for the Water Pollution Control Directorate, Environment Canada, Ottawa, 1972. 190 p.

A summary report on commercial and industrial methods for spent liquor in-plant recovery and out-of-plant effluent secondary treatment, with regard to process design, operation and performance.

EPS 3-WP-73-1*, Advanced Wastewater Technology, A Selective, Coded Bibliography, by M.F.D. Hamoda, E.E. Shannon and N.W. Schmidtke, Wastewater Technology Centre, Environment Canada, Ottawa, 1973. 132 p.

References are categorized according to the type of advanced wastewater treatment process and systematically coded.

EPS 3-WP-73-2, Selected References on Phosphorus Removal, by B.P. LeClair, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1973. 41 p.

A literature survey arranged in categories related to the chemical(s) used for precipitation of, or process used for, the removal of phosphorus.

EPS 3-WP-73-3*, Report of Pulp and Paper Pollution Abatement Mission to the USSR, Ottawa, 1973. 44 p.

Report of a mission arranged under the auspices of the Canada-USSR agreement on the exchange of science and technology (Working Group of the Forest Based Industries).

EPS 3-WP-73-4*, Pollution and the Fisheries, Proceedings of the 27th Annual Meeting of the Fisheries Council of Canada, 1972, Ottawa, 1973. 35 p.

Papers presented at the above meeting, during the session entitled "Pollution and the Fisheries".

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* Available on microfiche only.
Disponible seulement sur microfiche.

EPS 3-WP-73-5, Inventory of Spray Irrigation Systems in the Great Lakes Basin of Canada, prepared by Reid, Crowthers and Partners Ltd., for the Water Pollution Control Directorate, Ottawa, 1973. 15 p.

Survey of all major spray irrigation systems for waste disposal in the province of Ontario, as well as industrial and sanitary effluent systems using spray irrigation as a partial or total disposal method.

EPS 3-WP-73-5F, Inventaire des installations d'irrigation par aspersion dans le bassin des Grands Lacs au Canada, préparé par Reid, Crowthers and Partners Ltd., pour la Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978. 15 p.

Inventaire de tous les principaux systèmes d'irrigation par arrosage employés pour l'élimination des déchets en Ontario ainsi que des systèmes de traitement industriel ou sanitaire des effluents utilisant l'irrigation par arrosage comme méthode d'élimination partielle ou complète des déchets.

EPS 3-WP-73-6, Biological Treatment and Toxicity Studies, T.W. Beak Consultants Ltd., for the Water Quality Branch, Inland Waters Directorate, and the Water Pollution Control Directorate, Environment Canada, Ottawa, 1973. 167 p.

A comprehensive survey of three aerated lagoons treating kraft mill effluents in Canada.

EPS 3-WP-73-7, A Study of the Waste Characteristics of Fish Processing Plants, by K.T. Broderson, University of Ottawa, for the Water Pollution Control Directorate, Ottawa, 1972. 76 p.

A study of 8 fish processing plants located in the province of New Brunswick to determine waste characteristics of the fish processing industry.

EPS 3-WP-73-8, An Effluent Study of a Freshwater Fish Processing Plant, by M.J. Riddle, Food and Allied Products Division, Water Pollution Control Directorate, Ottawa, 1972. 33 p.

Paper originally presented at the 27th Annual Purdue Industrial Waste Conference, May, 1972.

EPS 3-WP-74-1, Characterization and Treatment of Fish Processing Plant Effluents in Canada, by M.J. Riddle and K. Shikaze, Food and Allied Products Division, Water Pollution Control Directorate, Ottawa, 1973. 44 p.

Summary of 5 studies conducted to collect data on waste characteristics and treatability of effluents from fish processing plants.

EPS 3-WP-74-1F, Nature et mode d'épuration des effluents provenant des usines de traitement du poisson au Canada, par M.J. Riddle et K. Shikaze,

Division des industries alimentaires et entreprises connexes, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1979. 40 p.

Résumé de cinq études faites dans le but de recueillir des données sur les caractéristiques et les possibilités de traitement des déchets provenant des effluents des usines de traitement du poisson.

EPS 3-WP-74-2, Maritime Fish Processing Plant Effluent Study, by S. Nutt, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1972. 68 p.

A study to determine the waste characteristics and water usage in groundfish filleting and sardine canning processes.

EPS 3-WP-74-4, Preliminary Review of Used Lubricating Oils in Canada, by D.J. Skinner, under the direction of W.A. Neff, Petroleum and Industrial Organic Chemicals Division, Water Pollution Control Directorate, Ottawa, 1974. 112 p.

A survey of the present situation in Canada including overall volumes produced, chemical compositions, current end uses and disposal methods, and a brief look at existing legislation.

EPS 3-WP-74-4F, Les huiles de graissage usagées au Canada, par D.J. Skinner, sous la direction de W.A. Neff, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1977. 83 p.

Exposé de la situation canadienne actuelle de l'utilisation des huiles lubrifiantes comprenant les quantités totales produites, les compositions chimiques, les derniers usages habituels et les méthodes pour s'en défaire, ainsi qu'un bref aperçu de la réglementation actuelle.

EPS 3-WP-75-1, Fish Processing Plant Effluent Treatment and Guidelines, Seminars held January, April and May, 1974. Ottawa, 1975. 480 p.

Papers presented at seminars held on Fish Processing Operations Liquid Effluent Guidelines, sponsored by Environment Canada with the cooperation of the Fisheries Association of British Columbia, the New Brunswick Fish Packers' Association and the Fisheries Association of Newfoundland and Labrador.

EPS 3-WP-75-2, Review of the Canadian Metal Finishing Industry: Consumption of raw materials and options for water pollution control, by the Inorganic Chemicals Program, Water Pollution Control Directorate, Ottawa, 1975. 151 p.

Review of basic background information on the processes used in the Canadian metal finishing industry, its waste products and waste reduction practices.

EPS 3-WP-75-2F, Rapport sur l'industrie canadienne de traitement des surfaces métalliques, Direction de la dépollution et du contrôle, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978. 140 p.

Revue de l'information de base sur les procédés utilisés pour la mise en forme des métaux au Canada, les déchets produits et les méthodes de réduction de la pollution.

EPS 3-WP-75-3, Water Transport of Wood: The current situation, by John Karau, for the Water Pollution Control Directorate, Ottawa, 1975. 72 p.

A study of wood floatage in eastern Canada in relation to the national scene.

EPS 3-WP-75-3F, Le transport du bois par eaux, par John Karau, pour la Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978. 60 p.

Une étude du flottage du bois dans l'est du Canada par rapport à la situation nationale.

EPS 3-WP-75-4, Review of Heated Discharge Management and Control Alternatives: Once-through systems in large water bodies, by James F. MacLaren Ltd., for the Water Pollution Control Directorate, Ottawa, 1975. 161 p.

Review of current literature and foreign legislation dealing with heated discharges from thermal power plants.

EPS 3-WP-75-4F, Étude des méthodes de gestion et de contrôle des effluents chauds - Les systèmes de refroidissement en circuit ouvert et les effets de leurs effluents dans les grandes masses d'eau, par James F. MacLaren Ltd., pour la Direction générale de la lutte contre la pollution des eaux, Ottawa, 1979. 126 p.

Revue des récentes publications et lois étrangères relatives aux effluents des centrales thermiques.

EPS 3-WP-75-5, Mine and Mill Wastewater Treatment, by Water Pollution Control Directorate staff in cooperation with the Treatment Working Group of the Mining Regulations Task Force, Ottawa, 1975. 141 p.

Describes types of contaminants encountered in wastewaters from metal mining and milling operations, current treatment technology, and the economic impact of effluent treatment on the industry.

EPS 3-WP-75-5F, Le traitement des eaux usées provenant de l'exploitation des mines et de la préparation des minerais, préparé par le personnel de la Direction générale de la lutte contre la pollution des eaux en

collaboration avec le Groupe d'étude sur le traitement des eaux usées du Groupe d'étude sur les règlements miniers, Ottawa, 1978. 110 p.

Description des types de contaminants produits par l'extraction et le broyage des minerais, ainsi que des traitements actuels et des répercussions économiques du traitement des effluents sur l'industrie.

EPS 3-WP-75-6, Status Report on Abatement of Effluents from the Canadian Pulp and Paper Industry - 1974, by Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1975. 28 p.

Data are presented for effluent discharges from 1969 to 1974, and projections are made to 1977, 1980 and 1983, based on 1974 production levels.

EPS 3-WP-75-6F, Rapport sur le progrès de la réduction de la pollution provenant des effluents de l'industrie des pâtes et papiers - 1974, Direction de la dépollution et du contrôle, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978. 24 p.

Le rapport présente des données sur le volume des effluents rejetés de 1969 à 1974 et établit des projections pour 1977, 1980 et 1983, à partir des rejets de 1974.

EPS 3-WP-76-1, Inventory of Canadian Commercial Ships on the Great Lakes, by German and Milne, Naval Architects, for the Water Pollution Control Directorate, Ottawa, 1976. 57 p.

Analysis of data obtained through questionnaires submitted to shipping companies operating in the Great Lakes/St. Lawrence Seaway region, including numbers of ships, major characteristics and vessel waste control problems.

EPS 3-WP-76-1F, Inventaire des navires commerciaux canadiens dans les Grands Lacs, par German and Milne, Architectes navals, pour la Direction générale de la lutte contre la pollution des eaux, Ottawa, 1979. 48 p.

Analyse de réponses à des questionnaires envoyés aux transporteurs maritimes de la voie maritime du Saint-Laurent et des Grands Lacs, comportant l'inventaire des navires, leur caractéristiques principales et les problèmes posés par le traitement de leurs déchets.

EPS 3-WP-76-2, Development of Design Guidelines for Shore-side Holding Tanks, by M.M. Dillon Limited, for the Water Pollution Control Directorate, Ottawa, 1976. 48 p.

Describes requirements for shore-side holding tanks receiving sewage from ships, including system design and operation, and capital and operating costs.

EPS 3-WP-76-2F, Élaboration de lignes directrices pour la conception de réservoirs terrestres d'emmagasinement des eaux usées des navires, par M.M. Dillon Ltée, pour la Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978. 33 p.

Description des conditions requises pour l'installation, sur la terre ferme, de réservoirs destinés à recevoir les eaux usées recueillies à bord des bateaux, y compris celles de leur fonctionnement et aperçu des coûts d'immobilisation et d'exploitation.

EPS 3-WP-76-3, Development of Design Guidelines for Shipboard Holding Tanks, by German & Milne, Naval Architects, for the Water Pollution Control Directorate, Ottawa, 1976. 101 p.

Describes requirements for shipboard holding tanks, including design, construction, operation and economic aspects.

EPS 3-WP-76-3F, Lignes directrices concernant la construction de bacs collecteurs d'eaux vannes à bord des navires, par German & Milne, Ingénieurs conseil, pour la Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978. 70 p.

Description des conditions requises pour l'installation de réservoirs d'eaux usées à bord de navires, de leur conception, de leur construction, de leur fonctionnement et des aspects économiques.

EPS 3-WP-76-4, Proceedings of Seminars on Water Pollution Abatement Technology in the Pulp and Paper Industry, held May 1975, sponsored by the Environmental Protection Service, Fisheries and Environment Canada, and the Technical Section, Canadian Pulp and Paper Association, Water Pollution Control Directorate, Ottawa, 1976. 220 p.

Compilation of seven papers, discussing such topics as regulations and waste characterization, suspended solids removal, biological and physical-chemical treatment methods, and sludge dewatering.

EPS 3-WP-76-4F, Comptes rendus de séminaires sur la pollution de l'eau - techniques d'épuration des eaux usées de l'industrie des pâtes et papiers, Séminaires tenus les 1 et 2 mai, 1975, à Ottawa, Ontario, les 5 et 6 mai, 1975, à Moncton, N.-B., et les 21 et 22, mai, 1975, à Prince George, C.-B., subventionnés par le Service de la protection de l'environnement, Environnement Canada, et par la Section technique de l'Association canadienne des pâtes et papiers. Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 220 p.

Compilation de sept communications traitant de questions telles que la caractérisation des déchets, l'élimination des matières en suspension, l'épuration biologique, le traitement physico-chimique, les essais de toxicité, et la déshydration des boues.

EPS 3-WP-76-5, Review of Colour Removal Technology in the Pulp and Paper Industry, by R.J. Rush and E.E. Shannon, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1976. 113 p.

Literature review covering basic concepts of pulp and paper manufacture, the nature of colour and its effects on receiving waters, alternative processes for colour removal and suitability of various processes for different types of installations.

EPS 3-WP-76-5F, Analyse des techniques de décoloration dans l'industrie des pâtes et papiers, par R.J. Rush et E.E. Shannon, Centre technique des eaux usées, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1979. 78 p.

Étude bibliographique sur les notions fondamentales de la fabrication des pâtes et des papiers, sur la nature de la couleur et sur ses effets sur les eaux réceptrices, sur les différentes procédés de décoloration et sur l'application de divers procédés à différents types d'installations.

EPS 3-WP-76-6, A Modification of the Traditional Sequence for the Treatment of Wastewaters from Metal Finishing Installations, by L. Buffa, Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1976. 11 p.

Investigates the effect that a controlled amount of dilution on water would have on the amounts of contaminants discharged from metal finishing operations.

EPS 3-WP-76-6F, Modification du schéma classique de l'épuration des effluents de l'industrie du traitement des surfaces métalliques, par L. Buffa. Direction générale de la lutte contre la pollution des eaux, Ottawa 1978. 11 p.

Étude de l'effet d'une quantité limitée d'eau de dilution sur la quantité de polluants rejetés par les ateliers de préparation des surfaces métalliques.

EPS 3-WP-76-7, Review of Environmental Control of Mercury in Japan, by L. Buffa, Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1976. 81 p.

Reviews Japanese legislation relating to mercury discharges, control technology at two Japanese chlor-alkali plants, and papers presented at the International Congress of Scientists on the Human

Environment, Kyoto, Japan, 1975, relating to the Canadian mercury control situation.

EPS 3-WP-76-7F, Rapport sur la protection de l'environnement contre le mercure au Japon, par L. Buffa, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978. 70 p.

Revue de la législation japonaise portant sur les rejets de mercure; des techniques antipollution employées par deux fabriques japonaises de chlore; et communications au Congrès international des chercheurs dans le domaine de l'environnement humain, à Kioto (Japon) en 1975, ayant trait à la lutte contre le mercure au Canada.

EPS 3-WP-76-8*, NTA (Nitrilotriacetic Acid) - An Ecological Appraisal, by A. Prakash, Water Pollution Programs Branch, Water Pollution Control Directorate, Ottawa, 1976. 45 p.

Assessment of the ecological distribution and effects of NTA in the aquatic ecosystem, factors affecting biodegradability of NTA, and current and projected levels of NTA in the environment.

EPS 3-WP-76-9, A Bacteriological Investigation of Meat and Poultry Packing Plant Effluents with Particular Emphasis on Salmonella, compilation of reports from the EPS Northwest and Ontario Regions. Water Pollution Control Directorate, Ottawa, 1976. (1) 74 p., (2) 74 p.

Results of two studies of the bacteriological characteristics of the raw effluents from meat and poultry packing plants and the effectiveness of conventional treatment processes in the reduction of Salmonella populations.

EPS 3-WP-76-10, Wastewater and Sludge Control in the Canadian Metal Finishing Industry, by L. Buffa, Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1976. 33 p.

Technical and economic aspects of development of national effluent requirements for the segment of the metal finishing industry which includes chemical and electrolytic finishing of surfaces, cyanide hardening, and electrochemical machining and polishing.

EPS 3-WP-76-10F, Contrôle des eaux résiduaires et des boues dans l'industrie canadienne du traitement des surfaces métalliques, par L. Buffa, Direction de la dépollution et du contrôle, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1979. 26 p.

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* Available on microfiche only.
Disponible seulement sur microfiche.

Aspects techniques et économique de l'élaboration de normes nationales concernant les effluents du secteur de l'industrie de la préparation des surfaces métalliques qui fait la préparation chimique et électrolytique des surfaces, la trempe en bain de cyanure et le façonnage et le polissage électrochimiques.

EPS 3-WP-76-11, Status Report on Abatement of Water Pollution from the Canadian Petroleum Refining Industry - 1975, Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1976. 54 p.

Progress made to the end of 1975 in meeting the discharge objectives of the Petroleum Effluent Regulations and Guidelines, and projections of anticipated status through to 1980.

EPS 3-WP-76-11F, Rapport sur la lutte contre la pollution des eaux par les raffineries de pétrole (1975), Direction de la dépollution et du contrôle, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1977. 45 p.

Progrès réalisés jusqu'à la fin de 1975 et prévus jusqu'en 1980 dans le contexte du Règlement et des Lignes directrices sur les effluents des raffineries de pétrole.

EPS 3-WP-77-1*, Utilities Delivery in Arctic Regions, Proceedings of Symposium held March 16, 17 and 18, 1976, in Edmonton Alberta, sponsored by Environment Canada and the University of Alberta, Daniel W. Smith, ed., Water Pollution Control Directorate, Ottawa, 1977. 596 p.

Compilation of 26 papers given in five sessions: early developments; thermal conditions; design guidelines for piping systems; equipment and materials; and case studies.

EPS 3-WP-77-2, Literature Review on Wastewater Technology in the Wood and Timber Processing Industry, by Thurlow and Associates, Environmental Control Consultants Ltd., for the Water Pollution Control Directorate, Ottawa, 1977. 70 p.

Reviews published information on wastewater characteristics and abatement technology in the wood and timber processing industry.

EPS 3-WP-77-2F, Étude des textes relatifs aux caractéristiques des eaux usées et aux techniques d'épuration dans l'industrie du traitement du bois, Thurlow and Associates, Environmental Control Consultants Ltd., pour la Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 60 p.

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* Available on microfiche only.
Disponible seulement sur microfiche.

L'étude récapitule la documentation sur les caractéristiques des eaux résiduaires et les techniques d'épuraturation appliquées dans le traitement du bois.

EPS 3-WP-77-3, Waste Handling, Disposal and Recovery in the Metal Finishing Industry, Proceedings of Seminar held in Toronto, Ontario, November 12-13, 1975, sponsored by Fisheries and Environment Canada, the Automotive Parts Manufacturers' Association (Canada) and the American Electroplaters' Society, Ottawa, 1977. 158 p.

Topics discussed related to recycle, disposal and centralized treatment of metal finishing wastes, as well as the status of government regulations.

EPS 3-WP-77-3F, Manipulation traitement, récupération des déchets du traitement des surfaces métalliques, procès-verbal, colloque tenue à Toronto, les 12 et 13 novembre 1975, grâce à l'appui financier du ministère canadien de l'environnement, de l'Automotive Parts Manufacturers' Association du Canada, et l'American Electroplaters' Society, Ottawa, 1979. 122 p.

Sujets traités: recyclage, rejet et traitement centralisé des effluents des ateliers de traitement des surfaces métalliques, ainsi que l'état de la réglementation gouvernementale.

EPS 3-WP-77-4, Drying Potato Wastes for Animal Feed as an Alternative Disposal Method, by Canadian Bio Resources Ltd., for the Water Pollution Control Directorate, Ottawa, 1977. 85 p.

Evaluation of the marketability of dried potato waste as animal feed, applicability of existing drying systems and the potential market for a suitable drying system.

EPS 3-WP-77-4F, Le recyclage par déshydration des déchets de pommes de terre pour l'alimentation du bétail, par Canadian Bio Resources Ltd., pour la Direction générale de la lutte contre la pollution des eaux, Ottawa, 1979. 71 p.

Évaluation des possiblités de commercialisation du résidu déshydraté de pommes de terre pour nourrir les animaux, d'utilisation des hydrateuses existantes, et du marché accessible à une déshydrateuse efficace.

EPS 3-WP-77-5, Review of Treatment Technology in the Fruit and Vegetable Processing Industry in Canada, by Stanley Associates Engineering Ltd., for the Water Pollution Control Directorate, Ottawa, 1977. 207 p.

Reviews wastewater treatment technology and effluent quality in the Canadian fruit and vegetable processing industry.

EPS 3-WP-77-6, Annotated Bibliography on Northern Environmental Engineering 1974-75, by James F. Cameron and Daniel W. Smith, Northern Technology Centre, Water Pollution Control Directorate, Ottawa, 1977. 154 p.

References are abstracted and indexed by keywords and subject.

EPS 3-WP-77-7, State-of-the-art Review of Processes for Treatment and Reuse of Potato Wastes, by J.P. Stephenson and P.M.H. Guo, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1977. 84 p.

Review of pertinent literature; unit operations used in the industry, with emphasis on french fry and potato chip sectors; treatment technology; and results of a questionnaire survey of the Canadian potato processing industry conducted in 1973.

EPS 3-WP-77-7F, Revue des procédés actuels de traitement et de réutilisation des déchets de pommes de terre, par J.P. Stephenson et P.M.H. Guo, Centre technique des eaux usées, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1979. 67 p.

Étude bibliographique des unités de production de l'industrie, en particulier de la pomme de terre frite et des chips et des techniques de transformation; résultats d'une étude menée par l'industrie canadienne de transformation de la pomme de terre, en 1973.

EPS 3-WP-77-8, Technology and Associated Cost for Sulphite Pulping Spent Liquor Recovery, by Howard Edde, Inc., for the Water Pollution Control Directorate, Ottawa, 1977. 82 p.

Reviews new technology and cost considerations of pulping spent liquor recovery, with special emphasis on the recovery of liquor from high yield pulping.

EPS 3-WP-77-9, Status Report on Abatement of Water Pollution from the Canadian Pulp and Paper Industry - 1976, Abatement and Compliance Branch, Water Pollution Control Directorate, 1977. 22 p.

Summarizes progress made to the end of 1976 in limiting the discharge of pollutants in liquid effluents from the Canadian pulp and paper industry.

EPS 3-WP-77-10, Critical Evaluation of Extended Aeration Systems in Arctic and Subarctic Regions, by P.W. Given and D.W. Smith, Northern Technology Centre, Water Pollution Control Directorate, Ottawa 1977. 59 p.

Information related to the failure and success of extended aeration plants in northern areas is summarized. It was found that the reasons for poor performance were related to design deficiencies and, in particular, less conscientious and skilled operation.

EPS 3-WP-77-11, Estimate of Costs for Water Pollution Control Measures in the Pulp and Paper Industry, by Beak Consultants Ltd., for the Water Pollution Control Directorate, Ottawa, 1977. 24 p.

Projected estimates of the capital and operating costs that will be incurred by the Canadian pulp and paper industry in complying with the Federal pulp and paper effluent regulations.

EPS 3-WP-77-12, (E/F) Status Report on Compliance with the Chlor-Alkali Mercury Regulations - 1975, Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1977. 17 p.

Reviews progress made to the end of 1975 in reducing the consumption and discharges of inorganic mercury in effluents from Canadian chlor-alkali plants.

Rapport concernant l'observation du règlement sur le mercure provenant des fabriques de chlore et de soude caustique - 1975, Direction de la dépollution et du contrôle, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1977.

Rapport sur la réduction en 1975, de l'utilisation et des rejets de mercure inorganique dans les effluents des fabriques de chlore du Canada.

EPS 3-WP-77-13, Heated Discharge Control and Management Alternatives - Small water bodies and rivers, by James F. MacLaren Limited, for the Water Pollution Control Directorate, Ottawa, 1977. 285 p.

Basic concepts of waste heat management on shallow and deep small water bodies, defined as a body in which the far-field hydrothermal effects can be detected in a major portion or all of the water body, and rivers are reviewed and examples are discussed.

EPS 3-WP-78-1, The Timber Processing Industry - Seminar Proceedings, Toronto, Ontario, March 10-11, 1977, sponsored by the Water Pollution Control Directorate and the Canadian Institute of Timber Construction, Water Pollution Control Directorate, Ottawa, 1978. 155 p.

Proceedings of seminar held in anticipation of the development of environmental regulations for the timber processing industry; papers presented review wood preservatives and effluent treatment.

EPS 3-WP-78-2, An Inventory of the Fruit and Vegetable Processing Industry in Canada, by Stanley Associates Engineering Ltd., for the Water Pollution Control Directorate, Ottawa, 1978. 133 p.

Production figures, waste treatment techniques and effluent loadings for the fruit and vegetable processing industry, excluding potato processing, are reviewed.

EPS 3-WP-78-3, Technical, Economic and Environmental Aspects of Wet and Dry Debarking, by Beak Consultants Ltd., for the Water Pollution Control Directorate, Ottawa, 1978. 189 p.

The energy requirements, economics, product quality, and effects on subsequent manufacturing processes of wet and dry debarking methods are compared. Characteristics and treatment of wastewater from dry debarking are reviewed.

EPS 3-WP-78-4, Wastewater Disinfection in Canada, Water Pollution Control Directorate, Ottawa, 1978. 91 p.

Existing disinfection requirements in Canada, and in the United States and Europe, are summarized. The effectiveness of chlorination in combatting the spread of waterborne diseases is assessed, and the possible effects of residual chlorine and chlorination byproducts on man and aquatic species are discussed. Alternative methods of disinfection are considered.

EPS 3-WP-78-4F, La désinfection des eaux usées au Canada, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 66 p.

Le rapport évalue l'efficacité de la chloration, et examine les options de rechange quant à leur efficacité à détruire les agents pathogènes, leur coût relatif, leur incidence sur l'environnement, la possibilité d'y avoir recours et autres considérations d'ordre pratique.

EPS 3-WP-78-5, Land Application of Food Processing Wastewater, Design and Operations Manual, by Stanley Associates Engineering Ltd., for the Water Pollution Control Directorate, Ottawa, 1978. 236 p.

Land application systems which have been used in the treatment of food processing wastewaters are described, and a method for approaching the design of such a system is presented.

EPS 3-WP-78-6, Wood Driving Operations in Sweden and Finland, Water Pollution Control Directorate, Ottawa, 1978. 73 p.

Methods of transporting wood, legislation, volumes driven, and environmental and other problems are described.

EPS 3-WP-78-7, Wastewater Generation and Disposal in Veneer and Plywood Plants in British Columbia, by R.G. Thompson, Environmental Protection Service, Pacific Region. Water Pollution Control Directorate, Ottawa, 1978. 28 p.

Wastewaters from plywood and veneer plants were analysed; plant operations that generate wastewater were examined; and wastewater treatment and disposal practices are described. Data obtained indicated that all wastewater generated in these plants is toxic to fish at low effluent concentrations.

EPS 3-WP-78-7F, Production et évacuation des eaux résiduaires des usines de fabrication de placages et de contreplaqués en Colombie-Britannique, par R.G. Thompson, Service de la protection de l'environnement, Région du Pacifique. Water Pollution Control Directorate, Ottawa, 1979. 46 p.

L'étude visait à caractériser les eaux résiduaires des usines de placage et de contreplaqué; à examiner, sur place, les opérations qui en produisent et à établir une bibliographie des procédés de traitement et d'évacuation actuellement employés dans cette industrie.

EPS 3-WP-78-8, An Assessment of the Financial Impact of Federal Guidelines on the Canadian Metal Finishing Industry, by L. Buffa, Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1978. 40 p.

The ability of the Canadian metal finishing industry to absorb the cost of meeting the Metal Finishing Liquid Effluent Guidelines issued November, 1977, is assessed. Only independent installations were assessed on the assumption that operations that are part of larger companies will be able to meet the requirements with available financial resources.

EPS 3-WP-78-9, Disinfection of Poultry Packing Plant Effluents Containing Salmonella, by Dearborn Environmental Consulting Services Ltd., for the Water Pollution Control Directorate, Ottawa, 1978. 160 p.

The effectiveness of chlorination and ozonation to control salmonella in poultry processing effluents from three plants in Ontario was investigated. Disinfection requirements were found to be site-specific. Operating costs for ozonation and chlorination-dechlorination systems were estimated at \$0.17/1000 gal (\$0.04/m^3) and \$0.054/1000 gal (\$0.01/m^3), respectively.

EPS 3-WP-79-1, Annotated Bibliography on Northern Environmental Engineering 1976-77, by Bryan C. Armstrong and James J. Cameron, Northern Technology Centre, Water Pollution Control Directorate, Ottawa, 1979. 132 p.

Sequel to Report No. EPS 3-WP-77-6. References are abstracted and indexed by keywords and subject.

EPS 3-WP-79-2, Cold Climate Utilities Delivery Design Manual, prepared by a Canada-U.S. International Committee composed of Daniel W. Smith, Sherwood Reed, James J. Cameron, Gary W. Heinke, Fred James, Barry Reid, William L. Ryan and Jon Scribner. Water Pollution Control Directorate, 1979.

Provides guidance for the design of utility systems in cold regions, including planning, construction and operation of utility services. Engineering practices used in temperate climates are not always appropriate in the North, and new technology and approaches are often required to design systems operable at cold temperatures, under severe weather conditions, and in isolated areas.

EPS 3-WP-79-3, Evaluation of Physical-Chemical Technologies for Water Reuse, Byproduct Recovery and Wastewater Treatment in the Food Processing Industry, by Dearborn Environmental Consulting Services Ltd., for the Water Pollution Control Directorate, Ottawa, 1979. 172 p.

A comprehensive review of physical-chemical and advanced treatment technologies and their application in the food processing industry, including design criteria, operational information, economic considerations and case histories.

EPS 3-WP-79-3F, Évaluation des méthodes physico-chimiques de réemploi de l'eau, de récupération des sous-produits et de traitement des effluents de l'industrie alimentaire, par Dearborn Environmental Consulting Services Ltd., pour la Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 191 p.

Fournit des renseignements sur les techniques de traitement physico-chimique et les autres techniques de pointe dans ce domaine ainsi que sur leur utilisation dans l'industrie alimentaire.

EPS 3-WP-79-4, Analysis and Use of Urban Rainfall Data in Canada, by Charles Howard and Associates Ltd., for the Water Pollution Control Directorate, Ottawa, 1979. 35 p.

Rainfall data for 35 Canadian urban centres were analysed and have been assembled as a guide to engineers involved in the design of urban runoff and pollution control facilities. Rainfall storm event analyses are presented as tabular summaries of annual rainfall events, and statistical tables for four rainfall storm event characteristics: volume, duration, intensity, and inter-event time.

EPS 3-WP-79-5, (E/F)

Status Report on Abatement of Water Pollution from the Canadian Petroleum Refining Industry (1977), Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1979. 39 p.

An assessment of the progress made to the end of 1977 in meeting the discharge objectives of the Petroleum Refinery Effluent Regulations issued under the Fisheries Act in 1973, and projections of anticipated status by 1980.

Rapport sur la lutte contre la pollution des eaux causée par les raffineries de pétrole au Canada (1977), Direction de la dépollution et du contrôle, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1979. 39 p.

Le rapport évalue le progrès, à la fin de 1977, que le Règlement sur les effluents des raffineries de pétrole, promulgué en vertu de la Loi sur les pêcheries en novembre 1973, a permis de réaliser, et effectue une extrapolation pour les années 80.

EPS 3-WP-79-6,

Secondary Fibres Pulping/Deinking Effluent Toxicity Study, by Beak Consultants Ltd., for the Water Pollution Control Directorate, Ottawa, 1979. 37 p.

Effluents from five integrated secondary fibres pulping/deinking mills were sampled and found to be toxic. Toxicity was attributed to the pulp washing (deinking) effluent stream. The deinking process is described and a brief review of the literature is presented.

EPS 3-WP-79-7,

Biological Treatment of Food Processing Wastewater Design and Operations Manual, by Stanley Associates Engineering Ltd. for the Water Pollution Control Directorate, Ottawa, 1979. 216 p.

Information is provided regarding the design and operational requirements of currently available technology for biological treatment of food processing wastewaters. Twelve case histories are described.

EPS 3-WP-79-8, (E/F)

Status Report on Compliance with the Chlor-Alkali Mercury Regulations 1976-77, Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1979. 14 p.

Mercury losses in liquid effluents from chlor-alkali plants in Canada have been reduced by over 99% since 1970.

Rapport sur l'observation du réglement concernant les rejets de mercure par les fabriques de chlore et de soude caustique en 1976-77, Direction de la dépollution et du contrôle, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1979. 14 p.

Les rejets de mercure dans les effluents des fabriques de chlore du Canada ont été réduits dans une proportion de plus de 99 p. cent depuis 1970.

EPS 3-WP-79-9, Toxicity of Effluents from Sulphite Pulping Operations Practicing Recovery and Biological Treatment, by Beak Consultants Ltd., for the Water Pollution Control Directorate, Ottawa, 1979. 51 p.

Samples of effluents from seven sulphite pulp mills practicing chemical recovery and biological treatment were collected and analysed for toxicity. Biological treatment was usually capable of detoxifying the effluents.

EPS 3-WP-80-1, Water Intake, Wastewater Production and Treatment, and Air Pollution Control in Coal-Fired Steam-Electric Power Generating Stations, by CH_2M Hill Ltd., for the Water Pollution Control Directorate, Ottawa, 1980. 145 p.

Basic air and water emission requirements, and power plant design and operating characteristics are reviewed. Three water management systems (once-through, recirculation with limited discharge, and zero discharge) are evaluated under selected conditions, and their impacts on water consumption and wastewater treatment are compared.

EPS 3-WP-80-2, Water Conservation Alternatives for the North, prepared by James J. Cameron and Bryan C. Armstrong, Northern Technology Unit, Water Pollution Control Directorate, Ottawa, 1980. 45 p.

Reviews water use characteristics, pricing policies, plumbing codes, public acceptance, water conservation experiences, and methods and technology to reduce water use and the concomitant energy requirements in northern communities.

EPS 3-WP-80-2F, Divers moyens d'économiser l'eau dans les régions du Nord, préparé par J. Cameron et Bryan C. Armstrong, Section de technologie des régions du Nord, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 43 p.

On examine les caractéristiques d'utilisation de l'eau, les modalités de fixation des prix, les codes de plomberie et les méthodes et techniques de réduction de l'utilisation de l'eau, ainsi que les besoins connexes en énergie, la réaction du public et les expériences de conservation de l'eau.

EPS 3-WP-80-3, Design and Selection of Small Wastewater Treatment Systems, by S.A. Ross, Abatement and Compliance Branch, and P.H.M. Guo and B.E. Jank, Technology Development Branch, Water Pollution Control Directorate, Ottawa, 1980.

General information on available treatment alternatives, and an outline of the steps and procedures involved in selecting wastewater management schemes for communities of up to 2500 people are provided.

EPS 3-WP-80-4, (E/F)

Status Report on Abatement of Water Pollution from the Canadian Pulp and Paper Industry (1978), Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1980. 23 p.

Summarizes the progress made to 1978 in meeting the requirements of the Pulp and Paper Effluent Regulations issued in 1971. (See also EPS 3-WP-75-6 and EPS 3-WP-77-9).

Rapport provisoire sur la dépollution de l'eau dans l'industrie canadienne des pâtes et papiers (1978), Direction de la dépollution et du contrôle, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 25 p.

En novembre 1971, le gouvernement fédéral promulguait un règlement pour limiter la pollution par les effluents de l'industrie des pâtes et papiers. Le présent rapport résume les progrès réalisés en ce sens en 1978. (Voir aussi EPS 3-WP-75-6 et EPS 3-WP-77-9).

EPS 3-WP-80-5,

Utilities Delivery in Northern Regions. Proceedings of Symposium held in Edmonton, Alberta, March 19, 20 and 21, 1979. Water Pollution Control Directorate, Ottawa, 1980. 542 p.

Presents 30 papers dealing with: utility programs, energy considerations, technology applications, fire protection, operation and maintenance of utilities, heat tracing and thawing, computer applications, and case studies.

EPS 3-WP-80-6F,

Méthode de tarification en épuration, Volume 1, Rapport de l'étude, préparé par Edna B. Boisselle, Pierre Côté, de Barré, Pellerin, Lemoine Inc. pour le Service de la protection de l'environnement. Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 198 p.

Étude du programme d'ordinateur TAREP sur la tarification en épuration des eaux avec applications aux cas de Waterloo et Granby au Québec.

EPS 3-WP-80-7F,

Méthode de tarification en épuration, Volume 2, Manuel de l'utilisateur, préparé par Edna B. Boisselle, Pierre Côté, de Barré, Pellerin, Lemoine Inc. pour le Service de la protection de l'environnement. Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 121 p.

Méthode d'utilisation du programme TAREP comprennant toutes les informations nécessaires à la codification des données requises, la description et la liste des énoncés du programme.

EPS 3-WP-81-1, (E/F)

Survey of Polychlorinated Biphenyls in Industrial Effluents in Canada, Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1981. 19 p.

Effluent samples containing more than 0.1 ppb PCBs were obtained from industrial plants using PCBs in products, PCB-containing components in equipment, and recycled PCB-contaminated materials.

Les biphenyles polychlorés dans les effluents industriels au Canada, Direction de la dépollution et du contrôle, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1981. 21 p.

Des échantillons contenant plus de $0,1 \times 10^{-9}$ de BPC provenaient d'établissements industriels dont les produits contenaient des BPC, dont l'équipement fonctionnait au moyen de matériaux contenant des BPC, et qui employaient des matériaux recyclés contaminés par les BPC au cours des opérations.

EPS 3-WP-81-2, (E/F)

Status Report on Compliance with the Chlor-Alkali Mercury Liquid Effluent Regulations 1978-79, Abatement and Compliance Branch, Water Pollution Control Directorate, Ottawa, 1981. 16 p.

Reviews progress made in reducing the consumption and discharges of inorganic mercury in effluents from Canadian chlor-alkali plants. (See also EPS 3-WP-77-12 and EPS 3-WP-79-8).

Rapport sur l'observation, par les usines de chlore, du règlement sur le mercure contenu dans les effluents en 1978-79, Direction de la dépollution et du contrôle, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1981. 16 p.

Le rapport examine les résultats des mesures prises en vue de restreindre la consommation et les rejets de mercure dans les effluents des usines de chlore du Canada. (Voir aussi EPS 3-WP-77-12 et EPS 3-WP-79-8).

Technology Development **Technologie**

EPS 4-WP-72-4*,

Orientation Report for a High-rate, Two-stage Activated Sludge Process, based on a report by Van Luven Consultants Ltd., prepared for the Water Pollution Control Directorate, Ottawa, 1972. 40 p.

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* Available on microfiche only.
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A study of this modification of the activated sludge process and description of its use in seven treatment plants.

EPS 4-WP-73-1*, The Welland Canal Water Quality Control Experiments (Phase I), Earl E. Shannon and Derek T. Vachon, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1973. 43 p.

Sections of the abandoned (fourth) Welland Canal were treated with chemical precipitants to evaluate water quality control alternatives.

EPS 4-WP-73-3*, Detergent Substitution Studies at C.F.S. Gloucester, by E.E. Shannon and Leonard J. Kamp, Wastewater Technology Centre, Environment Canada. Ottawa, 1973. 139 p.

Report of a study which monitored wastewater characteristics and treatment plant performance under baseline, NTA, carbonate, high-phosphate and citrate laundry detergent substitution conditions.

EPS 4-WP-73-4*, An Evaluation of European Experience with the Rotating Biological Contactor, by T.W. Beak Consultants Ltd. for the Water Pollution Control Directorate, Environment Canada. Ottawa, 1973. 95 p.

A brief survey of European experience with the rotating biological contactor (RBC) process applied to the secondary treatment of various industrial and domestic wastes.

EPS 4-WP-73-5*, Phosphorus Removal Treatability Studies at C.F.B. Borden, Petawawa, Trenton and Uplands, by E.E. Shannon and R.J. Rush, Wastewater Technology Centre, Environment Canada. Ottawa, 1973. 34 p.

Results of studies in which traditional phosphorus precipitants (ferric chloride, alum and lime) were evaluated with respect to phosphorus removal efficiency via standard jar testing procedures.

EPS 4-WP-73-6, Biological Treatment of Airport Wastewater Containing De-icing Fluids, by B.E. Jank, P.H.M. Guo and V.W. Cairns, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1973. 133 p.

A study conducted to investigate the feasibility of treating a combination of de-icing fluids and airport wastewater using an activated sludge process.

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EPS 4-WP-74-1, Tertiary Phosphorus Removal and Limiting Nutrient Studies at C.F.S. Lac St. Denis, by E.E. Shannon and J.M. Salvo, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1974. 60 p.

Describes pilot plant experiments carried out on the treatment of the stabilization pond effluent from C.F.S. Lac St. Denis.

EPS 4-WP-74-2, A Modified Procedure for the Determination of Phosphorus in Detergents, by P.D. Goulden, Environmental Management Service, and M.C. Holton, Environmental Protection Service. Water Pollution Control Directorate, Ottawa, 1974. 20 p.

Describes a modified titrimetric procedure which overcomes the difficulties experienced in the ASTM procedure at low phosphorus levels.

EPS 4-WP-74-2F, Nouvelle méthode de mesure de la teneur en phosphore des détergents, par P.D. Goulden, Service de la gestion de l'environnement, et M.C. Holton, Service de la protection de l'environnement. Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978. 15 p.

Description d'une méthode de titrage modifiée permettant d'éliminer les difficultés rencontrées avec la méthode ASTM à faibles concentrations de phosphore.

EPS 4-WP-74-3, Full Scale Phosphorus Removal at C.F.B. Petawawa, by E.E. Shannon, J.M. Salvo and B.R. Burns, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1974. 45 p.

Describes phosphorus removal studies employing alum addition to the primary wastewater treatment plant at C.F.B. Petawawa.

EPS 4-WP-74-4, "The Cleanosaurus" - A Benthos Harvester, summary report by A.R. Townshend, Technology Development Branch, Water Pollution Control Directorate, Ottawa, 1974. 25 p.

Describes the construction, testing and operation of a prototype multi-head benthos harvester called the "Cleanosaurus", developed under contract by Errol Stewart, Inventor, Rockland, Ontario.

EPS 4-WP-74-5, Phosphorus Removal Demonstration Study Using Ferric Chloride and Alum at C.F.B. Uplands, by Walter E. Stepko and Earl E. Shannon, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1974. 58 p.

Describes a 10-month full scale phosphorus removal study conducted on the activated sludge treatment plant at C.F.B. Uplands.

EPS 4-WP-74-6, Continuous Biological Dentrification of Wastewater, by P.M. Sutton, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1974. 242 p.

Examines the feasibility of using continuous microbial dentrification for nitrate removal from municipal wastewater over a range of temperatures.

EPS 4-WP-74-7, A Study of NTA Degradation in a Receiving Stream, by E.E. Shannon, P.S.A. Fowlie and R.J. Rush, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1974. 25 p.

Describes an investigation of nitrilotriacetic acid (NTA) levels in Grindstone Creek, the receiving water for the Waterdown, Ontario, wastewater treatment plant, under seasonal conditions.

EPS 4-WP-74-7F, La dégradation de l'acide nitrilo-triacétique dans un cours d'eau récepteur, par E.E. Shannon, P.S.A. Fowlie and R.J. Rush, Centre technique des eaux usées. Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978. 22 p.

Étude sur les concentrations saisonnières d'acide nitrilotriacétique (NTA) dans le ruisseau Grindstone, dans lequel se déversent les eaux provenant de l'usine de traitement des eaux usées de Waterdown, Ontario.

EPS 4-WP-74-8, Operational Experience with a Base Metal Mine Drainage Pilot Plant, by P.M. Huck, B.P. LeClair and P.W. Shibley, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1974. 34 p.

Preliminary report on a project to determine metal levels in conventionally treated mine effluents, define performance of treatment units, investigate sludge handling and examine effluent polishing techniques.

EPS 4-WP-74-9, Phosphorus Removal Demonstration Studies at C.F.B. Trenton, by Walter E. Stepko and Earl E. Shannon, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1974. 35 p.

Describes full scale phosphorus removal studies, using alum addition to an activated sludge treatment plant.

EPS 4-WP-74-10, The Welland Canal Water Quality Experiments (Phase II), by E.E. Shannon, F.J. Ludwig, D.T. Vachon and I.F. Munawar, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1974. 59 p.

Details the results of full scale alum treatment of the Fourth Welland Canal and describes the continuing program on the experimental basins.

EPS 4-WP-75-1, Experimental Burning of Waste Oil as a Fuel in Cement Manufacture, by E.E. Berry, Ontario Research Foundation, L.P. MacDonald, St. Lawrence Cement Company, and D.J. Skinner, Water Pollution Control Directorate, Ottawa, 1975. 187 p.

Used lubrication oil was burned as a portion of the total fuel requirement for a dry-process cement kiln.

EPS 4-WP-75-1F, Utilisation expérimentale de l'huile usée comme combustible dans la fabrication du ciment, par E.E. Berry, Ontario Research Foundation, L.P. MacDonald, St. Lawrence Cement Company, et D.J. Skinner, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1979. 187 p.

Combustion d'huile de graissage usée constituant une fraction de tout le combustible nécessaire à la marche d'un four à ciment par voie sèche.

EPS 4-WP-75-2, Utilization of Aluminized Red Mud Solids (ARMS) for Phosphorus Removal, by E.E. Shannon, Wastewater Technology Centre and K.J. Verghese, Aluminum Company of Canada Ltd. Water Pollution Control Directorate, Ottawa, 1975. 15 p.

Pilot plant experiments utilizing ARMS to treat municipal wastewater are described and results are compared to results from a similar aluminum sulphate experiment.

EPS 4-WP-75-3, The BOD_5 and Toxicity of Effluents from Sulphite Pulping for Newsprint, by D.J. Kubes and A. Wong, Pulp and Paper Research Institute of Canada, for the Water Pollution Control Directorate, Ottawa, 1975. 18 p.

The toxicity and 5-day biochemical oxygen demand (BOD_5) of laboratory produced sodium base bisulphite pulps covering a yield range from 60 to 80% were measured.

EPS 4-WP-76-1, Factors Affecting Activated Sludge Treatment of Kraft Bleachery Effluent, by P. Guo, W. Bedford and B. Jank, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1976. 30 p.

Bench and pilot scale experiments were carried out to determine the effects of pH, temperature, storage time and nutrient addition on activated sludge treatment of kraft bleachery effluent.

EPS 4-WP-76-1F, Facteurs influant sur l'épuration par boues activées des eaux résiduaires du blanchiment Kraft, par P. Guo, W. Bedford et B. Jank, Centre technique des eaux usées, Direction générale de la pollution des eaux, Ottawa, 1979. 23 p.

Des expériences en laboratoire et en unité pilote ont été effectuées afin de déterminer les effets du pH, de la temperature, du temps d'entreposage et de l'addition d'éléments nutritifs sur le traitement par boues activée des effluents des ateliers de blanchiment des pâtes Kraft.

EPS 4-WP-76-2, "CABOS" - A New Wastewater Treatment System for Vessels, by H. Lomas, Ontario Research Foundation, and A. Townshend, Water Pollution Control Directorate, Ottawa, 1976. 65 p.

A carbon absorption - bio-oxidation system (CABOS) was designed for treatment of black and grey water from commercial vessels on the Great Lakes.

EPS 4-WP-76-2F, Le SACOB, un nouveau système de traitement des eaux usées pour les navires, rapport sommaire rédigé par H. Lomas, de l'Ontario Research Foundation et A.R. Townshend, de la Direction générale de la lutte contre la pollution des eaux. Ottawa, 1980. 42 p.

Une unité de traitement des eaux usées de toilettes et des eaux usées totales des navires commerciaux par l'adsorption sur charbon actif et l'oxydation biologique a été conçue afin de satisfaire aux exigences de qualité des effluents non dilués déversés dans les Grands lacs.

EPS 4-WP-76-3, Recycling of Liquid Digested Sludge on Dredged River Sand, by V.K. Chawla, J. Yip and D.B. Cohen, Wastewater Technology Centre. Water Pollution Control Directorate Ottawa, 1976. 44 p.

Sludge was applied to three plots at rates of 1560, 2860 and 6190 kg TKN/ha, and plant growth and leachate samples were monitored for bacterial growth, nutrient and metal contents.

EPS 4-WP-76-3F, Recyclage des boues digérées par épandage sur lits de sable provenant du dragage de rivières, V.K. Chawla, J. Yip et D.B. Cohen, Centre technique des eaux usées, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 33 p.

L'usine d'épuration de l'île Iona, à Vancouver a été le site d'une étude de 18 mois de l'épandage sur terrain sablonneux des boues résiduaires ayant subi une digestion primaire.

EPS 4-WP-76-4, Phosphorus Removal Demonstration Studies at C.F.B. Trenton, Phase II, by W.E. Stepko, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1976. 33 p.

Performance of an activated sludge treatment plant was monitored when alum was added for phosphorus removal.

EPS 4-WP-77-1, Activated Sludge Treatment of a High Strength NSSC Mill Effluent, by P.M.H. Guo, W.K. Bedford and B.E. Jank, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1977. 76 p.

Bench scale studies were carried out to investigate the feasibility of treating high strength Neutral Sulphite Semi-chemical (NSSC) pulp mill effluents using an activated sludge process.

EPS 4-WP-77-1F, Traitement d'un effluent concentré de fabrique de pâte S.C.S.N. au moyen du procédé des boues activées, P.H.M. Guo, W.K. Bedford et B.E. Jank, Centre technique des eaux usées, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 58 p.

Des essais effectués sur une échelle réduite ont permis d'étudier la possibilité de traiter au moyen des boues activées les effluents très concentrés des fabriques de pâtes mi-chimiques au sulfite neutre.

EPS 4-WP-77-2, Burning Waste Chlorinated Hydrocarbons in a Cement Kiln, L.P. MacDonald, St. Lawrence Cement Co., D.J. Skinner, Fisheries and Environment Canada, and F.J. Hopton and G.H. Thomas, Ontario Research Foundation, for the Water Pollution Control Directorate, Ottawa, 1977. 223 p.

Describes an experimental program carried out at the St. Lawrence Cement Co., Mississauga, Ontario, in which waste chlorinated hydrocarbons, containing up to about 46 weight percent chlorine, were burned in a rotary cement kiln.

EPS 4-WP-77-2F, La combustion des déchets d'hydrocarbures chlorés dans des fours à ciment, par L.P. MacDonald, Compagnie des ciments du St-Laurent, et D.J. Skinner, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1981. 221 p.

Compte rendu d'expériences de brûlage d'hydrocarbures résiduaires contenant jusqu'à 46 p. 100 de chlore lié par poids, dans un four à ciment rotatif.

EPS 4-WP-77-3, An Assessment of Kraft Bleachery Effluent Toxicity Reduction Using Activated Sludge, by B.E. Jank, D.W. Bissett, V.W. Cairns and P.H.M. Guo, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1977. 108 p.

A pilot-scale two-stage activated sludge system was operated on a six-stage kraft bleachery effluent to study the practicability of using this system to meet effluent requirements specified in the Pulp and Paper Effluent Regulations (1971).

EPS 4-WP-77-3F, La détoxication des eaux résiduaires du blanchiment de la pâte kraft par le procédé des boues activées, B.E. Jank, D.W. Bissett, V.W. Cairns et P.H.M. Guo, Centre technique des eaux usées, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 74 p.

Nous avons expérimenté un traitement pilote en deux stades pour les boues activées de l'effluent du procédé de blanchiment en six stades.

EPS 4-WP-77-4, Screening Demonstration for Three Fish Processing Plant Effluents, by G. Lindsay, EPS Atlantic Region, and N.W. Schmidtke, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1977. 36 p.

The effectiveness of fine mesh screening devices in removing suspended solids from three fish processing plant effluents was evaluated.

EPS 4-WP-77-5, Experimental Burning of Delayed Coke in a Wet Process Cement Kiln, by L.P. MacDonald, St. Lawrence Cement Co., and F.J. Hopton, Ontario Research Foundation, a joint government-industry project conducted under the Development and Demonstration of Pollution Abatement Technology (DPAT) program, Water Pollution Control Directorate, Ottawa, 1977. 52 p.

Delayed coke was burned in a wet process cement kiln to determine the maximum rate of coke burning possible with available equipment, and the effect of the burn on both air and product quality.

EPS 4-WP-77-6, Demonstration of the "CABOS" Wastewater Treatment System for Vessels (1975-77), a development and demonstration project conducted under the Canada/United States Agreement on Great Lakes Water Quality by the Ontario Research Foundation, installation and modifications by Scott Misener Steamships Limited, report prepared by the Technology Development Branch, Water Pollution Control Directorate, Ottawa, 1977. 51 p.

Describes evaluation of the first prototype CABOS (carbon absorption bio-oxidation system) aboard a bulk carrier owned and operated by Scott Misener Steamships Limited.

EPS 4-WP-77-6F, Démonstration du SACOB système de traitement des eaux usées pour les navires (1975-77), projet de mise au point et de démonstration réalisé sous contrat dans le cadre du programme n°. 7, Accord Canada/Etats-Unis sur la qualité des eaux des Grands lacs, sous la direction du V. Pancuska et D.K. Smith, Ontario Research Foundation, installation et modifications par Graham Mitchel, Scott Misener Steamships Limited. Rapport

sommaire rédigé par A.R. Townshend, Direction du développement technologique, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 42 p.

Description de l'évaluation du premier prototype d'un nouveau système d'épuration biologique modifié sur un "vraquier" appartenant à la Scott Misener Steamships Limited et exploité par elle.

EPS 4-WP-77-7, Scavenging and Flocculation of Metal-Bearing Wastewaters with Polyelectrolytes, by P.M. Huck, McMaster University, and K.L. Murphy and B.P. LeClair, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1977. 98 p.

Study conducted to determine optimum conditions for the use of polymers in flocculation of metal hydroxides present in neutralized mine drainage.

EPS 4-WP-78-1, The Analysis of Chemical Digester Sludges for Metals by Several Laboratory Groups, by R. Knechtel, K. Conn and J. Fraser, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1978. 38 p.

An interlaboratory comparison conducted on four homogenized and dried municipal sludges from sewage treatment plants where chemical treatment was used for phosphorus removal.

EPS 4-WP-78-2, Phosphorus Removal Demonstration Studies Using Lime, Alum and Ferric Chloride at C.F.B. Borden, by W.E. Stepko and D.T. Vachon, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1978. 41 p.

Treatment plant performance with respect to total phosphorus, BOD_5 and suspended solids was monitored under baseline (no chemical addition) and at various lime, alum and ferric chloride addition levels.

EPS 4-WP-78-3, Air-Dried Chemical Sewage Sludge Disposal on Agricultural Land - Volume I, by D.N. Bryant and D.B. Cohen, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1978. 45 p.

Lysimeter experiments were conducted using two soil types (sand and clay), and three different sludges (alum, iron and lime) applied at different rates. Crop production (grain and straw), and nutrient and heavy metal concentrations in leachates and plants were determined.

EPS 4-WP-78-4, Treatment of Base Metal Mine Drainage at Pilot Scale, by P.M. Huck and B.P. LeClair, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1978. 80 p.

The suitability of conventional precipitation and sedimentation techniques to remove lead, zinc, copper and iron from various types of acid mine drainage was investigated at pilot scale. Optimum operating ranges were determined and attainable levels of extractable and dissolved metals are presented. Effluent toxicity was also investigated.

EPS 4-WP-78-5, Activated Sludge Degradation of Nitrilotriacetic Acid (NTA) - Metal Complexes, by E.E. Shannon and N.W. Schmidtke, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1978. 15 p.

Bench scale activated sludge experiments determined degradation rates for NTA-metal complexes. It was concluded that buildup of NTA in the aquatic environment, even in winter, is unlikely.

EPS 4-WP-78-6, Dewatering Alternatives for Potato Wastes - A Preliminary Study, by H.W. Campbell and J.W. Pike, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1978. 33 p.

Conditioning methods are identified for improving the dewaterability of potato wastes from lye peeling operations, and dewatering processes capable of producing a material suitable for either cattle feed or landfill are evaluated.

EPS 4-WP-79-1, Natural Freeze-Thaw Sewage Sludge Conditioning and Dewatering, by R.J. Rush, Rush Engineering Services Limited, and A.R. Stickney, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1979. 40 p.

A laboratory investigation and preliminary design for a natural freeze-thaw sewage sludge dewatering process are described. The process markedly improved the dewaterability of the four types of sewage sludges tested (conventional waste activated, extend aeration waste activated, aerobically digested and anaerobically digested).

EPS 4-WP-79-1F, Conditionnement et déshydration des boues par gel et dégel, par R.J. Rush, Rush Engineering Services Limited, et A.R. Stickney, Centre technique des eaux usées. Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 31 p.

Cette étude contient les résultats d'une recherche faite en laboratoire ainsi qu'un avant-projet technique d'extraction de l'eau des boues par le gel et le dégel. L'opération facilitait la déshydration de tous les types de boues étudiées.

EPS 4-WP-79-2, Phosphate Fertilizer and Sewage Sludge Use on Agricultural Land - The Potential for Cadmium Uptake by Crops, by M.D. Webber, Wastewater Technology Centre. Water Pollution Control Directorate, Ottawa, 1979. 32 p.

Canadian research on cadmium is soils and crops is reviewed and the potential for cadmium uptake by crops grown on soils enriched with phosphate fertilizer and sewage sludge is considered.

EPS 4-WP-79-3, Fish Toxicity Evaluation of Effluents from an Organic Chemical Production Complex, BASF, Germany, by V.W. Cairns, K. Conn and B.E. Jank, Wastewater Technology Centre, and V. Pagga, BASF Aktiengesellschaft. Water Pollution Control Directorate, Ottawa, 1979. 54 p.

BASF Aktiengesellschaft of the Federal Republic of Germany, and the Wastewater Technology Centre, Environmental Protection Service, cooperated in a study to assess the toxicity reduction capability of the wastewater treatment system at the BASF plant in Ludwigshafen, West Germany. Information obtained was to be used in determining the best practicable technology for the Canadian organic chemical industry.

EPS 4-WP-79-3F, Évaluation de la toxicité pour les poissons des effluents d'un complexe de chimie organique de la B.A.S.F., République fédérale d'allemagne, par V.W. Cairns, K. Conn et B.E. Jank, Centre technique des eaux usées (C.T.E.U.), et V. Pagga, B.A.S.F. S.A. Ludwigshafen, République fédérale d'allemagne, pour la Direction générale de la pollution des eaux, Ottawa, 1981. 56 p.

La S.A. BASF, d'Allemagne fédérale, et le Service canadien de la protection de l'environnement ont collaboré à une étude destinée à évaluer la capacité de détoxication du système d'épuration de l'usine de la BASF, située à Ludwigshafen. Les résultats obtenus devaient servir à déterminer les meilleures techniques practicables pour l'industrie canadienne des produits chimiques organiques.

EPS 4-WP-79-4, Leachability of Radioactive Constituents from Uranium Mine Tailings - Status Report (June 1974 - January 1977), D.N. Bryant and D.B. Cohen, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1979. 32 p.

Describes lysimeter experiments to determine the leaching of radioactive constituents from abandoned mine tailings, and $BaRaSO_4$ sediments from these tailings.

EPS 4-WP-79-4F, La percolation des constituants radioactifs de stériles de mines d'uranium - Rapport provisoire (juin 1974 - janvier 1977), par D.N. Bryant et D.B. Cohen, Centre technique des eaux usées, et R.W. Durham, Division de la recherche appliquée, Service de la gestion

de l'environnement. Direction générale de la lutte contre la pollution des eaux, Ottawa, 1981. 31 p.

Description d'un programme de recherche visant à déterminer la quantité de constituants radioactifs qui sont libérés, par percolation, des stériles abandonnés de mines d'uranium ainsi que des sédiments de $BaRaSO_4$ contenus dans ces mêmes stériles.

EPS 4-WP-79-5, Advanced Wastewater Treatment Technology in Canada (1979), by J.W. Schmidt, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1979. 57 p.

Describes the use of advanced wastewater treatment technology for municipal wastewaters in Canada. Pilot scale research and development projects of recent years are discussed.

EPS 4-WP-79-6F, Les avantages du traitement des eaux usées par flottation dans l'industrie du textile, par Boudreau, Dubeau, Lemieux (Inc.) pour le Service de la protection de l'environnement. Direction générale de la lutte contre la pollution des eaux, Ottawa, 1979. 117 p.

La présente étude, réalisée au moyen d'une unité pilote, vise à démontrer que les eaux usées de l'industrie du textile peuvent être réutilisées après un traitement par coagulation-floculation et aéroflotation.

EPS 4-WP-79-6E, Textile Industry Wastewater Treatment by Air Flotation, by Boudreau, Dubeau, Lemieux (Inc.), for the Environmental Protection Service, Water Pollution Control Directorate, Ottawa, 1981. 61 p.

Pilot-scale studies were conducted at three textile plants to evaluate the possibility of recycling textile wastewaters after coagulation-flocculation and air flotation treatment.

EPS 4-WP-79-7, Performance Evaluation of an Oxidation Ditch Treating Dairy Wastewater, by P.H.M. Guo, P.J.A. Fowlie, V.W. Cairns and B.E. Jank, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1979. 32 p.

Describes a comprehensive monitoring and sampling program at the wastewater treatment system of Gay Lea Foods Cooperative Limited, Tara, Ontario.

EPS 4-WP-79-8, Performance Evaluation of an Extended Aeration Activated Sludge Process for Dairy Wastewater, by P.H.M. Guo, P.J.A. Fowlie, V.W. Cairns and B.E. Jank, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1979. 31 p.

Describes a comprehensive monitoring and sampling program at the treatment system of Teeswater Creamery Limited, Teeswater, Ontario.

EPS 4-WP-79-9, Evaluation of Industrial Waste Carbon Sources for Biological Denitrification, by H.D. Monteith, T.R. Bridle and P.M. Sutton, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1979. 71 p.

Describes a project to identify and evaluate industrial wastes or waste by-products which could be used to replace methanol as a carbon source in biological denitrification of wastewater. Twenty-seven wastes exhibited denitrification rates equal to or greater than that observed using methanol. Economic considerations are discussed.

EPS 4-WP-79-9F, Evaluation des rejets industriels de carbone pour la dénitrification biologique, H.D. Monteith, T.R. Bridle et P.M. Sutton, Centre technique des eaux usées, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1980. 67 p.

Environ quinze des rejets analysés au cours de la présente étude présentaient une concentration de carbone suffisante pour effectuer une dénitrification, et leur quantité était également suffisante pour fournir un apport constant de carbone pour dénitrifier les eaux usées d'origine domestique et les eaux usées résiduaires industrielles.

EPS 4-WP-80-1, Toxicity Assessment of Treated Municipal Effluents, by S. Metikosh, V.W. Cairns and B.E. Jank, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1980. 36 p.

Describes a study to determine the acute lethality of undiluted primary and secondary effluents from 24 municipal activated sludge plants, and final effluents from five stabilization ponds produced during summer and winter. Samples were collected before chlorination.

EPS 4-WP-80-2, Activated Sludge and Activated Carbon Treatment of a Wood Preserving Effluent Containing Pentachlorophenol, P.H.M. Guo, P.J.A. Fowlie, V.W. Cairns and B.E. Jank, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1980. 77 p.

Describes a six-month monitoring and wastewater treatment plant effluent upgrading program at a plant which preserves wood with creosote, pentachlorophenol and chromated copper arsenate.

EPS 4-WP-80-3, Upgrading and Evaluation of an Oxidation Ditch Treating Dairy Wastewater, P.H.M. Guo, P.J.A. Fowlie, V.W. Cairns and B.E. Jank, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1980. 33 p.

Describes a sampling and upgrading program at the treatment system of a dairy processing plant, to establish base data to assess best practicable treatment of dairy wastes.

EPS 4-WP-80-3F, Amélioration et évaluation d'un fossé d'oxydation servant au traitement des eaux résiduaires de laiterie, par P.H.M. Guo, P.J.A. Fowlie, V.W. Cairns et B.E. Jank, Centre technique des eaux usées. Direction générale de la lutte contre la pollution des eaux, Ottawa, 1981. 29 p.

Pour réunir des données en vue d'évaluer les meilleures techniques applicables au traitement des eaux résiduaires de laiterie, le Centre technique des eaux usées a effectué des échantillonnages dans le circuit de traitement d'une laiterie canadienne et en a amélioré les dispositifs.

EPS 4-WP-80-4, Mill-Scale Application of the Rapson-Reeve Closed-Cycle Process at Great Lakes Forest Products Limited, by Great Lakes Forest Products Ltd. for the Water Pollution Control Directorate, a joint government-industry project conducted under the Development and Demonstration of Pollution Abatement Technology (DPAT) program, Ottawa, 1980. 64 p.

Problems encountered, process modifications required, and effects of the closed-cycle process on mill operation are described.

EPS 4-WP-81-1, Exploration Camp Wastewater Characterization and Treatment Plant Assessment, by D.T. Trinh, for Hydro Quebec and the Environmental Protection Service, Environment Canada, Water Pollution Control Directorate, Ottawa, 1981. 44 p.

The performances of an activated sludge process (Oxyvor) and a rotating biological contactor treating wastewater from an exploration camp were assessed.

EPS 4-WP-81-2, Toxicity Evaluation of Effluents from the Wastewater Treatment System at DSM's Chemical Plant in Holland, V.W. Cairns, K. Conn, and B.E. Jank, Wastewater Technology Centre, Water Pollution Control Directorate, Ottawa, 1981. 30 p.

Evaluation of the toxicity reduction capability of a new wastewater treatment system at Dutch State Mines' chemical plant.

Training Manuals **Guides de formation**

EPS 6-WP-73-1F, Pour des colloques plus efficaces, par Constance B. Woloschuk, pour la Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978. 12 p.

Lignes directrices sur la façon de préparer et de donner un séminaire d'information technique.

EPS 6-WP-74-1*, Notes - Workshop on Computer-Aided Design and Simulation of Waste Treatment Systems, by P.L. Silveston, Consultant, for the Water Pollution Control Directorate, Ottawa, 1974. 490 p.

Notes for a workshop held in January, 1974, concerning computer application to performance, planning and design studies of waste treatment systems.

EPS 6-WP-74-2*, Writing and Delivering Technical Speeches, prepared by A.R. Townshend, Water Pollution Control Directorate, Ottawa, 1974. 42 p.

Covers such topics as 'before writing', 'writing the speech', 'writing techniques', 'before speaking', 'performing' and 'evaluation'.

EPS 6-WP-74-2F, Comment rédiger et prononcer un discours technique, par A.R. Townshend, Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978.

Porte sur des sujets tels: 'avant la rédaction', 'la rédaction de l'exposé', 'méthode de rédaction', 'avant l'exposé', 'la réussite' et 'l'évaluation.

EPS 6-WP-74-3, The Basic Technology of the Pulp and Paper Industry and its Waste Reduction Practices, prepared by A.J. Bruley, Lakehead University, for the Water Pollution Control Directorate, Ottawa, 1974. 140 p.

Manual covering basic technology, new trends, and discharge contaminants of the pulp and paper industry.

EPS 6-WP-74-3F, Techniques de base de l'industrie des pâtes et papiers et méthodes de réduction de ses déchets, par A.J. Bruley, Université Lakehead, pour la Direction générale de la lutte contre la pollution des eaux, Ottawa, 1978.

Publication portant sur la technique de base, les nouvelles tendances et le rejet des contaminants par l'industrie des pâtes et papiers.

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* Available on microfiche only.
Disponible seulement sur microfiche.

EPS 8-WP-73-1, Base Metal Mine Waste Management in Northeastern New Brunswick, prepared by Montreal Engineering Co. Ltd., for the Water Pollution Control Directorate, Ottawa, 1973. 55 p.

A synopsis based on the findings of the Northeastern New Brunswick Mine Water Quality Program, aimed at ensuring that the valuable fishery resources of the area can be maintained and coexist with current and future base metal mining operations.

Miscellaneous Reports* **Divers***

1. Western Canada Water and Sewage Conference, September 19-21, 1973. Winnipeg, Manitoba. Proceedings of the 25th Annual Convention. Papers presented at conference sponsored by Environment Canada and the Federation of Associations on the Canadian Environment. Edmonton, Alberta, 1974.

2. Ontario Section, American Water Works Association, Pollution Control Association of Ontario, and Ontario Municipal Water Association, Proceedings of the Annual Conference, Toronto, Ontario, April 20-23, 1975, with the active participation of Environment Canada and the Federation of Associations on the Canadian Environment. Ottawa, 1976.

3. Sublethal Effects of Treated Liquid Effluent from a Petroleum Refinery on Freshwater Organisms, by J.B. Sprague, D.W. Rowe, G.F. Westlake, T.A. Hemming and I.T. Brown, J.B. Sprague Associates Ltd., for the Petroleum Association for Conservation of the Canadian Environment, and Environment Canada, October, 1978.

Speeches and Papers* **Discours/Communications***

1. The Toxicity of Food Processing Effluents to Fish, by D.W. Bissett, paper presented at the 7th National Symposium on Food Processing Wastes, held in Atlanta, Georgia, April 7-9, 1976.

2. The Optimization of Filtered and Unfiltered ^{226}Ra Removal from Uranium Mining Effluents - Status Report (1976-77), by P. Wilkinson and D.B. Cohen, paper presented at the Canadian Uranium Producers' Metallurgical Committee Workshop on ^{226}Ra Control, Ottawa, Canada, October 17, 1977.

3. Steel Industry Wastes, by D.T. Vachon, N.W. Schmidtke and T.R. Bridle, Wastewater Technology Centre, a literature review published in the Journal of the Water Pollution Control Federation, 51(6):1385-1393, June, 1979.

3F. Eaux résiduaries d'aciéries, par D.T. Vachon, N.W. Schmidtke and T.R. Bridle, Centre technique des eaux usées, Environment Canada, étude bibliographique, juin, 1979.

4. Sewage Sludge Utilization on Land - The Canadian Scene, by M.D. Webber, N.W. Schmidtke, and D.B. Cohen, Wastewater Technology Centre, paper presented at the Utilization of Sewage Sludge on Land Conference, Oxford, England, April 10-13, 1978.

5. Performance of a Rotating Biological Contractor under Transient Loading Conditions, by Michel P. Filion, Keith L. Murphy and Joseph P. Stephenson, paper

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* Not available on microfiche.
Non disponible sur microfiche.

presented at the 50th Annual Conference of the Water Pollution Control Federation, Philadelphia, Pa., October 2-7, 1977.

6. Municipal Sludge Disposal on Land, A Down-to-earth Solution, by N.W. Schmidtke and D.B. Cohen, Wastewater Technology Centre, paper presented at the 29th Annual Convention of the Western Canada Water and Sewage Conference, Edmonton, Alberta, September 29-30, 1977.

7. Wastewater Disinfection - Towards a Rational Policy, by G.V. Buxton and S.A. Ross, paper presented at the 51st Annual Conference of the Water Pollution Control Federation, Anaheim, California, October 1-6, 1978, and published in the WPCF Journal, August, 1979.

8. Lakes and Impoundments, by P.M. Higgins, presented at the 8th conference of the International Association on Water Pollution Research, Sydney, Australia, October 17-22, 1976.

8F. Lacs et réservoirs, par P.M. Higgins, présenté à la 8ième conférence de l'Association internationale pour la recherche sur la pollution des eaux, Sydney, Australie, du 17 au 22 octobre, 1976.

9. Management Strategies for Coastal Marine Pollution, by A. Prakash, paper submitted for publication in the inaugural issue of Water Pollution and Management Reviews, November, 1979.

9F. Stratégies de gestion anti-pollution dans le milieu marin côtier, par A. Prakash, Direction générale de la lutte contre la pollution des eaux, novembre 1979.

10. Disinfection of Dilute, Low-temperature Wastewater Using Ozone, by P.W. Given and D.W. Smith, Science and Engineering, 1, pp. 91-106.

10F. Désinfection à l'ozone d'eaux usées diluées, à basse température, par P.W. Given et D.W. Smith, Science and Engineering, 1, 1979. (traduction)

11. Water and Sanitation in the Northwest Territories, by J.J. Cameron and D.J. Gamble, The Northern Engineer, 9(4):4-12.

11F. Distribution de l'eau et matériels sanitaires dans les territories du nord-ouest, par J.J. Cameron, V. Christensen et D.J. Gamble, The Northern Engineer, 9 (4): 4-12. (traduction)

12. Radium-226 Removal from a Uranium Mill Tailings Pond Effluent, by D.W. Averill, G.H. Kassakhian, D. Moffett and R.T. Webber, paper presented at the Canadian Uranium Producers Metallurgical Committee, Elliott Lake, Ontario, May 17-18, 1979.

12F. Extraction du radium 226 d'un effluent d'exploitation d'uranium, par D.W. Averill, G.H. Kassakhian, D. Moffett et R.T. Webber, présenté à la réunion annuelle 1979, Comité métallurgique des producteurs canadiens d'uranium, Elliot Lake, Ontario, 17-18 mai 1979.

13. Treatment of Gold Milling Effluents, by H. Erkku and L.S. Price, paper presented at the 34th Annual Purdue Industrial Waste Conference, West Lafayette, Indiana, May 8-10, 1979.

13F. Traitement des effluents de broyage de l'or, par H. Erkku et L.S. Price, présenté à la 34e Conférence annuelle de Purdue sur les déchets industriels, West Lafayette, Indiana, les 8, 9 et 10 mai 1979.

14. Pilot Scale Deep Shaft Treatment of Dairy Wastewater, by B.E. Jank, paper presented at Workshop '79: New Developments in Wastewater Treatment, University of Toronto, March 7-8, 1979.

15. Joint Government-Industry Program for the Removal of Radium-226 from Uranium Mining Effluents, Interim Report No. 2, prepared by the Technical Working Group, 1980.

15F. Programme conjoint du gouvernement et de l'industrie pour l'élimination du radium 226 des effuents des mines d'uranium, rapport intérimaire no. 2, préparé par le groupe technique de travail, 1980.

16. Overview of Canadian Environmental Research in the Uranium Mining Industry, by J.W. Schmidt and D. Moffett, presented at the B.C. Water and Waste Association and Federation of Associations on the Canadian Environment Seminar on Uranium Mining and the Environment, Vancouver, British Columbia, April 11, 1979.

16F. Vue d'ensemble de la recherche canadienne sur l'environnement dans l'industrie de l'exploitation minière de l'uranium, par J.W. Schmidt et D. Moffett, présenté au Symposium de l'ANC sur la recherche connexe à la sécurité radiologique dans le cycle du combustible nucléaire, Toronto, Ontario, les 1 et 2 mai 1979.

17. Sludge Generation, Handling and Disposal at Phosphorus Control Facilities, by N.W. Schmidtke, presented at the 11th Annual Cornell University Conference on Phosphorus Management Strategies for the Great Lakes, Rochester, N.Y., April 17-20, 1979.

17F. Production, traitement et élimination des boues aux installations de déphosphatation, par N.W. Schmidtke, présenté à la 11th Annual Cornell University Conference on Phosphorous Management Strategies for the Great Lakes, 17-20 avril, Rochester, N.Y.

18. Sludge Production and Disposal at Primary and Secondary Treatment Plants, by N.W. Schmidtke, presented at l'Association Québécoise des techniques de l'eaux (AQTE) Conference, Montreal, Quebec, April 25-28, 1979.

18F. Production et élimination des boues dans les usines d'épuration primaire et secondaire, par N.W. Schmidtke, présenté à l'Association québécoise des techniques de l'eau (AQTE), congrès 1979, du 25 au 28 avril, Montréal, Québec.

19. Biological Fluidized Bed Denitrification of Wastewater, by J.P. Stephenson, presented at Workshop '79: New Developments in Wastewater Treatment, University of Toronto, March 7-8, 1979.

19F. Dénitrification biologique des eaux usées sur lit fluidisé, par J.P. Stephenson, pour l'Atelier 1979: Nouveaux développements dans le traitement des eaux usées, Université de Toronto, 7-8 mars 1979.

20. Wastewater Treatment Options for the Metal Finishing Industry - An Overview, by S.A. Ross, D.J. Hay, L. Buffa and G. Das, paper presented at the Wastewater Treatment Seminar, Montreal, November 5-6, 1979, sponsored by Environment Canada and l'Association Québécoise des techniques de l'eau.

20F. Survol des diverses possibilités d'épuration des eaux usées de l'industrie du traitement des surfaces métalliques, par S.A. Ross, D.J. Hay et L. Buffa, présenté au Colloque sur le traitement des eaux usées, Montréal, Novembre 5-6, 1979, parrainé par Environnement Canada et l'Association Québécoise des techniques de l'eau.

21. Wastewater Disinfection - A Status Report, by S.A. Ross and D.J. Hay, presented at a seminar on Water and Wastewater Disinfection Principles and Practices, sponsored by Environment Canada and the B.C. Water and Wastes Association, Vancouver, B.C., December 5-7, 1979.

21F. Rapport sur la désinfection des eaux résiduaires, par S.A. Ross et D.J. Hay, présenté au séminaire sur les principes et méthodes de désinfection de l'eau et des eaux usées, tenu du 5 au 7 décembre 1979, au Bayshore Inn, à Vancouver.

CANADA-ONTARIO AGREEMENT ON GREAT LAKES WATER QUALITY, RESEARCH PROGRAM FOR THE ABATEMENT OF MUNICIPAL POLLUTION

Unless otherwise indicated, these reports are available on microfiche and in paper copy. French translations are available on request.

Conference Proceedings

Conference Proceedings No. 1, Phosphorus Removal Design Seminar, Toronto, May 28-29, 1973. 450 p.

Compilation of 15 papers presented at the conference in four sessions: a) General; b) Mechanical and Process Design; c) Costs, Instrumentation and Chemical Handling; and, d) Sludge Handling, Treatment and Disposal.

Conference Proceedings No. 2, Sludge Handling and Disposal Senimar, Toronto, September 18-19, 1974. 465 p.

Compilation of 28 papers presented at the seminar, covering such topics as dewatering, centrifugation, incineration, metal removal or reclamation, trucking, pumping, and the effects of disposal on land.

Conference Proceedings No. 3, High Quality Effluents Seminar, Toronto, December 2-3, 1975. 371 p.

Compilation of 13 papers. Topics discussed included surface water management, water resources assessment, wastewater treatment by disinfection, chemical addition, filtration and biological systems, in relation to the need for higher quality effluents from sewage treatment plants.

Conference Proceedings No. 4, Storm Water Management Model Workshop, Toronto, October 19, 20 and 21, 1976. 334 p.

Compilation of 15 papers describing background material and theory behind the models and their computations, as well as instructions in their use; and input data and simulation results for four workshops dealing with practical problems.

ACCORD CANADA-ONTARIO SUR LA QUALITÉ DE L'EAU DES GRANDS-LACS, PROGRAMME DE RECHERCHE SUR LA POLLUTION MUNICIPALE

À moins d'indication contraire, ces rapports sont disponibles sur microfiche et sur papier. La traduction française de ces rapports est disponible sur demande.

Actes de la Conférence

Conference Proceedings No. 5, Modern Concepts in Urban Drainage, Toronto, March 28-30, 1977. 389 p.

Compilation of 15 papers describing polluting and hydrologic effects of urban drainage, and new methods and criteria for its control.

Conference Proceedings No. 6, Sludge Utilization and Disposal, Toronto, February 20-21, 1978. 428 p.

Compilation of 15 papers highlighting the results of six years of research on sludge handling and disposal conducted under the Canada-Ontario Agreement.

Research Reports **Rapports de recherche**

Research Report No. 1, Land Application of Sewage Sludge, by T.E. Bates, Dept. of Land Resource Science, University of Guelph, Guelph, Ontario. Project No. 71-4-1. Ottawa, 1973. 212 p.

A literature review to determine the extent of present knowledge for ecologically safe and agriculturally productive application of sewage sludge to farm lands.

Research Report No. 2, The Effects of Household Sanitary Systems on Effluent Phosphate Levels, by P.D. Lavalle, Industrial Research Institute, University of Windsor, Windsor, Ontario. Project No. 72-5-14. Ottawa, 1973. 67 p.

An assessment of the variation of phosphate input to urban waterways from residential areas serviced by septic tanks and sanitary systems in the Windsor area.

Research Report No. 3, Aerobic Digestion of Organic Sludges Containing Inorganic Phosphorus Precipitates, Phase I, by J. Ganczarczk, Dept. of Civil Engineering, Institute of Environmental Science and Engineering, University of Toronto, Toronto, Ontario. Project No. 72-5-4. Ottawa, 1973. 71 p.

An investigation of the feasibility of treating organic sludges containing phosphorus precipitates by the aerobic digestion process.

Research Report No. 4, Chemical Dosage Control for Phosphorus Removal, by Pollutech Pollution Advisory Services Ltd., Oakville, Ontario. Project No. 72-5-11. Ottawa, 1974. 80 p.

A study to determine if some simple monitoring procedure can be utilized to control chemical addition in municipal waste treatment plants.

Research Report No. 5, Use and Production of Iron Salts for Phosphorus Removal, by Donald S. Scott, Dept. of Chemical Engineering, University of Waterloo, Waterloo, Ontario. Project No. 72-3-5. Ottawa, 1973. 62 p.

An assessment of the supply and probable cost of iron salts for use as phosphorus removal chemicals in wastewater treatment.

Research Report No. 6, Utilization of Industrial Wastes and Waste By-Products for Phosphorus Removal: An inventory and assessment, by Peter J.A. Fowlie and Earl E. Shannon, Wastewater Technology Centre, Environment Canada Burlington, Ontario. Project No. 72-3-5. Ottawa, 1974. 87 p.

An investigation of alternative precipitant sources, such as industrial wastes and waste by products, which may have application in phosphorus removal.

Research Report No. 7, Integration of Physico-Chemical and Biological Wastewater Treatment Processes, by W.R. Drynan University of Waterloo, Waterloo, Ontario. Project No. 72-5-9. Ottawa, 1974. 112 p.

A study to provide some basic operation and performance data for a biological municipal wastewater treatment plant operating at various hydraulic loadings, when the physical-chemical process for phosphorus removal was added.

Research Report No. 8, Nutrient Control in Sewage Lagoons, Volume I, by Pollutech Pollution Advisory Services Ltd., Oakville, Ontario. Project No. 72-5-12. Ottawa, 1974. 56 p.

An investigation of the operational effects and behaviour of precipitated phosphates in sewage lagoons.

Research Report No. 9, Heavy Metals in Agricultural Lands Receiving Chemical Sewage Sludges, Volume I, by J.C. Van Loon, Dept.'s of Geology, Chemistry and the Institute of Environmental Sciences and Engineering, University of Toronto, Toronto, Ontario. Project No. 72-5-3. Ottawa, 1974. 37 p.

Describes sludge characterization studies conducted on samples obtained from North Toronto, Newmarket, and Point Edward sewage treatment plants, and metal analyses performed on Newmarket soils and vegetation on farms which received applications of sludge in 1971 and 1972.

Research Report No. 10, Design and Performance Criteria for Settling Tanks for the Removal of Physical-Chemical Flocs, Volume I, by

Dr. G.W. Heinke, Institute of Environmental Sciences and Engineering, University of Toronto, Toronto, Ontario. Project No. 72-5-7. Ottawa, 1974. 82 p.

A study of the settling behaviour of physical-chemical suspensions, both on a laboratory and full scale plant basis, to determine design and performance criteria for mixing-coagulation and settling tanks in wastewater treatment plants.

Research Report No. 11, To Establish Viable Methods of Maintaining Waste Treatment Facility Efficiencies with Reference to Flow Variations, Volume I, by James F. MacLaren Ltd., Willowdale, Ontario. Project No. 72-5-10. Ottawa, 1974. 91 p.

Evaluates the significance of flow equalization in waste treatment plants, and describes a methodology for sizing treatment plant facilities for equalized sewage flow.

Research Report No. 12, Wet Air Oxidation of Chemical Sludges, by R.R. Hudgins and P.L. Silveston, Dept. of Chemical Engineering, University of Waterloo, Waterloo, Ontario. Project No. 72-5-5. Ottawa, 1974. 79 p.

A study of wet air oxidation of eight Ontario sludges containing phosphorus.

Research Report No. 13, Phosphorus Removal in Seasonal Retention Lagoons by Batch Chemical Precipitation, by H.J. Graham and R.B. Hunsinger, Ontario Ministry of the Environment, Toronto, Ontario. Project No. 71-1-13. Ottawa, 1974. 40 p.

Investigation of batch chemical treatment of seasonal retention lagoons for phosphorus removal; describes field tests with three prime coagulants at dosages determined by jar tests using lagoon contents.

Research Report No. 14, Phosphorus Removal at the Sarnia Water Pollution Control Plant, by I.M. Gray, Research Branch, Ontario Ministry of the Environment, Toronto, Ontario. Project No. 71-2-1. Ottawa, 1974. 22 p.

Describes facilities at the Sarnia WPCP, and the effects of ferric chloride addition for phosphorus removal.

Research Report No. 15, Identification of Problem Areas in Water Pollution Control Plants, by K.M. Aazan and B.I. Boyko, Ontario Ministry of the Environment, Toronto Ontario. Project No. 73-1-27. Ottawa, 1974. 41 p.

A study of data obtained through a questionnaire circulated to 162 WPCP's in Ontario.

Research Report No. 16*, Land Disposal of Sewage Sludge, Volume I, by the University of Guelph, Guelph, Ontario. Project No. 72-5-17. Ottawa, 1975. 50 p.

Describes the first part of a 3 to 5 year study to determine the rates at which chemically treated sewage sludges may be safely applied to agricultural lands.

Research Report No. 17, Nitrogen Removal from Municipal Wastewater, by D.C. Climenhage, Du Pont of Canada Ltd., Maitland, Ontario. Project No. 72-5-15. Ottawa, 1975. 32 p.

A pilot plant evaluation of a nitrification-denitrification process for nitrogen and BOD removal, using carbon from sewage influent for denitrification.

Research Report No. 18, Bibliography on the Application of Reverse Osmosis to Industrial and Municipal Wastewaters, by H. Kirk Johnston, Environmental Management Service, and H.S. Lim, Environmental Protection Service, Environment Canada. Project No. 73-3-14. Ottawa, 1975. 117 p.

References date from 1968 to 1973. An introductory section provides information on the mechanisms and applications of reverse osmosis, and equipment design.

Research Report No. 19*, Recycling of Incinerator Ash, by Levente L. Diosady, Cambrian Processes Ltd. Project No. 73-5-5. Ottawa, 1975. 82 p.

Preliminary study on the recovery of valuable components of incinerated sewage sludge ash.

Research Report No. 20, Evaluation of the Barber-Colman Wetox Process for Sewage Sludge Disposal, by P. Seto and D.K. Smith, Ontario Research Foundation. Project No. 73-5-6. Ottawa, 1975. 75 p.

Technical and economic data for the Barber-Colman process are compared with data for other sludge disposal methods.

Research Report No. 21, The Use of Lime in the Treatment of Municipal Wastewaters, by R.J.P. Brouzes, Domtar Ltd. Project No. 72-5-8. Ottawa 1975. 127 p.

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* Available on microfiche only.
Disponible seulement sur microfiche.

Describes an investigation conducted to develop a process for treating municipal wastewaters based on the addition of lime.

Research Report No. 22, Spray Runoff Disposal of Waste Stabilization Pond Effluent, by N. Ehlert, Ontario Ministry of the Environment. Project No. 71-1-19. Ottawa 1975. 24 p.

Effluent from the Smithville, Ontario municipal waste stabilization pond was sprayed on sloping soil for two seasons to study this method of improving effluent quality.

Research Report No. 23, Nutrient Control in Sewage Lagoons, Volume II, by Pollutech Pollution Advisory Services, Ltd. Project No. 72-5-12. Ottawa 1975. 57 p.

An investigation of the effects of chemical addition on the operation of sewage lagoons, and the physical and/or chemical conditions in the lagoon on the removal of phosphorus.

Research Report No. 24, Land Disposal of Sewage Sludge, Volume II, by Departments of Land Resource Science and Microbiology, University of Guelph. Project No. 72-5-17. Ottawa, 1975. 276 p.

Runoff studies were carried out with chemically treated sewage sludges applied to various soils at different rates during the spring and fall of 1973, and winter, 1973-74. Crop yields, and nutrient and heavy metal content of crops are also presented.

Research Report No. 25, Heavy Metals in Agricultural Lands Receiving Chemical Sewage Sludges, Volume II, by J.C. Van Loon, University of Toronto. Project No. 72-5-3. Ottawa, 1975. 41 p.

Heavy metal contamination studies of soils, vegetation, groundwater and surface water were carried out at the Burlington Skyway sewage sludge disposal farm and the North Toronto sludge disposal area.

Research Report No. 26*, Review of Canadian Design Practice and Comparison of Urban Hydrologic Models, by James F. MacLaren Ltd. Project No. 74-8-31. Ottawa, 1975. 212 p.

Data were collected from municipalities across Canada on their storm sewer design practices, emphasizing policies, problems with flooding and frost conditions, and attitudes

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towards new trends in urban drainage management. Five urban hydrologic models were evaluated.

Research Report No. 27, Examination of Sewage and Sewage Sludge for Enteroviruses, Volume I, by the Ontario Ministry of Health. Project No. 72-5-1. Ottawa, 1975. 35 p.

Describes the first phase of a virus monitoring program, including virus surveillance studies on five Ontario sewage treatment plants, and laboratory studies.

Research Report No. 28, Removal of Phosphates and Metals from Sewage Sludge, by D.S. Scott and H. Horling, University of Waterloo. Project No. 73-5-7. Ottawa, 1975. 55 p.

Describes development of a process to extract metals and phosphates from anaerobically digested sludges with acid, yielding a solid product containing mostly iron and aluminum phosphates.

Research Report No. 29, Selected Bibliography on Ozone Disinfection, by A. Netzer and H.K. Miyamoto, Canada Centre for Inland Waters, Environment Canada. Project No. 74-3-17. Ottawa, 1976. 62 p.

References are listed in alphabetical order and a subject-author index is provided.

Research Report No. 30, Heavy Metals in Agricultural Lands Receiving Chemical Sewage Sludges, Volume III, by J.C. Van Loon, University of Toronto. Project No. 72-5-3. Ottawa, 1976. 37 p.

Describes existing and newly developed methods for the analysis of metals in sewage sludges, emphasizing atomic absorption and electrochemical techniques.

Research Report No. 31, Sludge Incineration and Precipitant Recovery, Volume I, by Derek Plummer, Wastewater Technology Centre, Environment Canada. Project No. 72-3-4. Ottawa, 1976. 33 p.

This volume presents a coded bibliography of literature on sludge incineration and precipitant recovery from 1968 to 1974.

Research Report No. 32, Direct Physico-chemical Treatment with Ozone, by J. Peter Jones and Jean Dufort, University of Sherbrooke. Project No. 72-5-16. Ottawa 1976.

Pilot plant study of direct physico-chemical treatment of wastewaters using ozone.

Research Report No. 33*, The Removal and Recovery of Metals from Sludge and Sludge Incinerator Ash, by Barry G. Oliver and John H. Carey, Canada Centre for Inland Waters, Environment Canada. Project No. 74-3-15. Ottawa, 1976. 58 p.

Electrochemical plating of Cu, Zn, Ni and Cd from digested sludges and sludge incinerator ash, using standard plate type electrodes and fluidized bed electrodes, was investigated.

Research Report No. 34*, The Effect of Storage on Storm and Combined Sewers, by J.G. Henry and P.A. Ahern, University of Toronto. Project No. 74-8-1. Ottawa, 1976. 106 p.

Storage methods for a residential subdivision of approximately 100 acres were investigated using a hydrograph model for estimating stormwater runoff.

Research Report No. 35, Land Disposal of Sewage Sludge, Volume III, by the Departments of Land Resource Science and Microbiology, University of Toronto. Project No. 72-5-17. Ottawa, 1976. 286 p.

Runoff studies with fall, winter and spring applied chemically treated sewage sludge, and field studies with bromegrass on a loam soil and with corn on a loam, a sandy loam and a clay loam soil.

Research Report No. 36, Pilot Scale Evaluation of a Physical-Chemical Wastewater Treatment System for Combined Sewer Overflows, by Pollutech Pollution Advisory Services Ltd. Project No. 74-8-29. Ottawa, 1976. 96 p.

Pilot scale investigation of the feasibility of using coarse screening, microscreening, and ozonation for the treatment of combined sewer overflows.

Research Report No. 37, Assessment of Polyelectrolytes for Phosphorus Removal, by A. Benedek, A.E. Hamielec, J.J. Bancsi and T. Ishige, Wastewater Research Group, McMaster University. Project No. 72-5-6. Ottawa, 1976. 227 p.

Describes a simple batch settling test for examining the process effectiveness of polyelectrolytes, optimum conditions for testing, and a theoretical data interpretation technique for application to continuous clarifiers.

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* Available on microfiche only.
Disponible seulement sur microfiche.

Research Report No. 38, The Harvest of Biological Production as a Means of Improving Effluents from Sewage Lagoons, by John H. Neil, Limnos Ltd. Project No. 74-5-11. Ottawa, 1976. 35 p.

Investigation of the feasibility of removing nitrogen and organic matter by harvesting algae, duckweed, daphnia and midge larvae.

Research Report No. 39, Effluent Polishing by Filtration Through Activated Alumina, Volume I, by Pollutech Pollution Advisory Services Ltd. Project No. 73-5-4. Ottawa, 1976. 60 p.

Effluent was treated with alum to reduce phosphorus concentrations to 1 or 2 mg/L and further polished in activated alumina columns.

Research Report No. 40, Effluent Polishing by Filtration Through Activated Alumina, Volume II, by Pollutech Pollution Advisory Services Ltd. Project No. 73-5-4. Ottawa, 1976. 110 p.

Continuation of study reported in Research Report No. 39, and investigates methods of removing phosphorus from the saturated alumina and estimates capital and operating costs.

Research Report No. 41, Winter Runoff from an Urban Catchment, by D.H. Waller and W.A. Coulter, Nova Scotia Technical College. Project No. 74-8-3. Ottawa, 1976. 50 p.

Information on winter runoff for a 163-acre combined sewer drainage area is discussed in terms of development and testing of runoff quantity and quality models.

Research Report No. 42, Instrumentation for Field Studies of Urban Runoff, by J. Marsalek, Canada Centre for Inland Waters, Environment Canada. Project No. 73-3-12. Ottawa, 1976. 82 p.

Recording precipitation gauges, sewer flow measurement instruments, and automatic wastewater samplers were examined and tested for quality of data, accuracy and reliability.

Research Report No. 43, Urban Drainage Model Comparison for a Catchment in Halifax, Nova Scotia, by D.H. Waller, W.A. Coulter, W.M. Carson and D.G. Bishop, Nova Scotia Technical College. Project No. 74-8-2. Ottawa, 1976. 35 p.

Comparison of the U.K. Road Research Laboratory runoff model and the RUNOFF block of the U.S. Environmental Protection Agency Storm Water Management Model using

rainfall-runoff data for a combined sewage drainage area in Halifax.

Research Report No. 44, Phosphorus Removal Within Existing Wastewater Treatment Facilities, by Boris I. Boyko and J.W. Gerald Rupke, Ontario Ministry of the Environment. Project No. 71-1-1. Ottawa, 1976. 43 p.

Reports on a number of projects undertaken to assist the Province of Ontario's phosphorus removal program.

Research Report No. 45, Practices, Policies and Technology of Storm and Combined Sewers in Foreign Countries, by Albery, Pullerits, Dickson and Associates Ltd. Project No. 74-8-17. Ottawa, 1976. 169 p.

Reviews current methods used to abate pollution associated with storm sewer discharges and combined sewer overflows, and research underway in several European countries and the United States.

Research Report No. 46, Computer-aided Planning of Regional Sludge Disposal Systems, by B & P Silveston, Engineers, and the Canadian Federation of Mayors and Municipalities. Project No. 73-5-8. Ottawa, 1976. 409 p.

Introduces potential users to the concepts of computer-aided planning, models for sludge disposal and information which must be developed in order to use these programs.

Research Report No. 47*, Storm Water Management Model Study, Volume I - Final report, by Proctor and Redfern Ltd. and James F. MacLaren Ltd. Project No. 73-5-10. Ottawa, 1976. 295 p.

Final results and conclusions of a study of storm water management models, and modifications required for Canadian conditions.

Research Report No. 48*, Storm Water Management Model Study, Volume II - Technical background, by Proctor and Redfern Ltd. and James F. MacLaren Ltd. Project No. 73-5-10. Ottawa, 1976. 148 p.

Comparative analyses of six storm water routing models and four water quality models, and a literature survey of material dealing with urban runoff quality and snowmelt quantity and quality.

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Research Report No. 49, Polychlorinated Biphenyls (PCB's) in Municipal Wastewaters: An assessment of the problem in the Canadian Lower Great Lakes, by E.E. Shannon, F.J. Ludwig and I. Valdmanis, Waste water Technology Centre, Environment Canada. Project No. 73-3-8. Ottawa, 1976. 28 p.

Survey of PCB concentrations in the raw wastewaters from 33 municipalities, and investigations of the fate of PCB's during conventional secondary treatment.

Research Report No. 50, Anaerobic Digestion of Lime Sewage Sludge, by S.A. Black, Ontario Ministry of the Environment. Project No. 71-1-18. Ottawa, 1976. 17 p.

Assesses the ability of the anaerobic digestion process to accept sludge produced by the addition of hydrated lime to the raw sewage of a conventional activated sludge plant.

Research Report No. 51, Heavy Metals in Agricultural Lands Receiving Chemical Sewage Sludges, Volume IV, by Jon C. Van Loon, Institute for Environmental Studies, University of Toronto. Project No. 72-5-3. Ottawa, 1976. 33 p.

Reviews existing and newly developed analytical methods for sewage sludge analysis. cf. Research Reports No. 9, 25 and 30.

Research Report No. 52, Examination of Sewage and Sewage Sludge for Enteroviruses, Volume II, by T.P. Subrahmanyan, Ontario Ministry of Health. Project No. 72-5-1. Ottawa, 1977. 35 p.

Describes results of virus surveillance studies at five sewage treatment plants using different phosphorus-removal techniques, and related laboratory studies.

Research Report No. 53, Land Application of Digested Sludge under Adverse Conditions, by the Regional Municipality of Niagara. Project No. 73-5-9. Ottawa, 1977. 59 p.

Describes field testing of five vehicles used for sludge disposal on land which, because of rain or spring melting conditions, had become impassable to normal sludge hauling vehicles.

Research Report No. 54, Upgrading of Sewage Lagoon Effluents, by J.W.G. Rupke and K. Chisholm, Ontario Ministry of Environment. Project No. 74-1-37. Ottawa, 1977. 27 p.

The most successful unit processes evaluated for the purpose of upgrading conventional lagoon effluent quality involved a

rotating biological contractor for ammonia nitrogen and soluble BOD reduction, followed by chemical coagulation-sedimentation and multi-media filtration.

Research Report No. 55, To Establish Viable Methods of Maintaining Waste Treatment Facility Efficiencies with Reference to Flow Variations, Volume II, by James F. MacLaren Ltd. Project No. 72-5-10. Ottawa, 1977. 67 p.

Benefits of equalization of sewage flow in waste treatment plants are examined; analyses of daily and diurnal variations in Ontario sewage treatment plants are described; a method for sizing and operation of equalization basins is proposed.

Research Report No. 56, Design and Performance Criteria for Settling Tanks for the Removal of Physical-Chemical Flocs, Volume II, by G.W. Heinke and A. Tay, Institute of Environmental Sciences and Engineering, University of Toronto. Project No. 72-5-7. Ottawa, 1977. 115 p.

Settling behaviour of physical-chemical suspensions was studied, and design guidelines and methods to predict the performance of settling tanks treating such suspensions are proposed.

Research Report No. 57, Malvern Urban Test Catchment, Volume I, by J. Marselek, Environmental Management Service, Canada Centre for Inland Waters, Fisheries and Environment Canada. Project No. 73-3-12. Ottawa, 1977. 55 p.

The topography, land use, hydrological characteristics, storm drainage and instrumentation of a 58-acre residential urban catchment are described, and simulation of a number of precipitation-runoff events is discussed.

Research Report No. 58, Aerobic Digestion of Organic Sludges Containing Inorganic Phosphorus Precipitates, Volume I, by J. Ganczarczyk and M.F.D. Hamoda, University of Toronto. Project No. 72-5-4. Ottawa, 1977. 81 p.

Experimental work on the aerobic digestion of sludges resulting from lime treatment of raw sewage is described.

Research Report No. 59, Full Scale Studies on the Thermophilic Anaerobic Digestion Process, by J. Smart and B.I. Boyko, Ontario Ministry of Environment. Project No. 73-1-29. Ottawa, 1977. 79 p.

Study conducted to assess the feasibility and performance and to provide economic guidelines for the thermophilic

anaerobic digestion process and compared with the conventional mesophilic system.

Research Report No. 60, Land Disposal of Sewage Sludge, Volume IV, by the Departments of Land Resource Science and Microbiology, University of Guelph. Project No. 72-5-17. Ottawa, 1977. 317 p.

Describes the results of the third year of a study in which fluid sewage sludge has been applied to land cropped with grain corn; runoff of water, soil, nutrients and metals were measured.

Research Report No. 61, Effect of Citrate and Carbonate Based Detergents on Wastewater Characteristics and Treatment, by E.E. Shannon, N.W. Schmidtke and P.J.A. Fowlie, Wastewater Technology Centre, Environmental Protection Service, Fisheries and Environment Canada. Project No. 73-3-7. Ottawa, 1977. 37 p.

Examination of the effects of citrate and carbonate based detergents on primary and activated sludge treatment processes when phosphorus removal by chemical precipitation was practised.

Research Report No. 62, Storm Water Management Model Study, Volume III - User's Manual, by Proctor and Redfern Limited and James F. MacLaren Limited. Project No. 73-5-10. Ottawa, 1977. 421 p.

User's manual for the Canadian Storm Water Management Model developed for Fisheries and Environment Canada and the Ontario Ministry of Environment. Volumes I and II of the study have been published as Research Reports No. 47 and 48.

Research Report No. 63, Storage for Water Quality Control - Meadowvale Test Site Study, by Micheal P.H. Murrey and Jerzy J. Ganczarcyk, University of Toronto. Project No. 75-8-36. Ottawa, 1977. 74 p.

Two computer models were applied for simulation of urban runoff phenomena in the test catchment of Meadowvale prior to development and after completion; a subroutine developed to simulate an in-stream settling basin-reservoir system for storm water quality control is described.

Research Report No. 64, Reliability of Nitrification Systems with Integrated Phosphorus Precipitation, by P.M. Sutton, K.L. Murphy, B.E. Jank and B.A. Monaghan, Wastewater Technology Centre, Environmental Protection Service, Fisheries and Environment Canada. Project No. 75-3-21. Ottawa, 1977. 115 p.

Effects of metal ion addition on nitrification were assessed by parallel operation of combined and separate sludge carbon removal-nitrification systems with and without chemical addition for phosphorus removal.

Research Report No. 65, Phosphorus Reduction from Continuous Overflow Lagoons by Addition of Coagulants to Influent Sewage, by H.J. Graham and R.B. Hunsinger, Ontario Ministry of Environment. Projects No. 71-1-16, 71-1-17 and 72-1-25. Ottawa, 1977. 76 p.

Ferric chloride, alum and lime were added continuously and singularly to the influent raw sewage at three waste stabilization ponds to reduce effluent total phosphorus below 1 mg/L, and the effects of these coagulants were assessed.

Research Report No. 66, Water Quality of Urban Storm Water Runoff in the Borough of East York, by W. Gordon Mills, Director of Engineering, Borough of East York. Project No. 74-1-40. Ottawa, 1977. 90 p.

The runoff from a 17.4 hectare residential area draining to a separate storm sewer system was monitored for three years.

Research Report No. 67, Chemical Sewage Sludge Disposal on Land (Lysimeter Studies), Volume I, by V.K. Chawla, D.N. Bryant, D. Liu and D.B. Cohen, Wastewater Technology Centre, Environmental Protection Service, Fisheries and Environment Canada. Project No. 72-3-6. Ottawa, 1977. 98 p.

Three chemically treated sludges (alum, iron and lime) were applied to two typical Ontario agricultural soils in lysimeters planted with orchard grass; grass harvests and leachates were monitored.

Research Report No. 68, Development of Prediction Models for Chemical Phosphorus Removal, Volume I, by B.P. Prested, E.E. Shannon and R.J. Rush, Wastewater Technology Centre, Environmental Protection Service, Fisheries and Environment Canada. Project No. 73-3-9. Ottawa, 1977. 52 p.

Project initiated to establish a data bank of phosphorus removal treatability study results.

Research Report No. 69, Reuse of Waste SO_2 and Phosphate Sewage Sludges by Solidification with Lime and Fly Ash, by Acres Consulting Services Limited, Niagara Falls. Project No. 72-5-2. Ottawa 1977. 22 p.

Investigates the feasibility of mixing sewage sludge with other waste ingredients to form a self-setting cement which

consolidates well and is capable of long term retention of the phosphates in a cementing matrix.

Research Report No. 70, Report of the Land Disposal of Sludge Subcommittee Projects Conducted 1971-78. Ottawa, 1978. 62 p.

Describes projects conducted on the handling and ultimate disposal of sewage sludge under the administration of the Land Disposal of Sludge Subcommittee of the Technical Committee for the Canada-Ontario Agreement on Great Lakes Water Quality.

Research Report No. 71, Development of an Efficient Sampling Strategy to Characterize Digested Sludges, by H.D. Monteith and J.P. Stephenson, Wastewater Technology Centre, Environmental Protection Service, Fisheries and Environment Canada. Project No. 74-3-16. Ottawa, 1978. 124 p.

Anaerobically digested liquid sludges from five Ontario water pollution control plants were examined to identify sources of constituent variability (nutrients, heavy metals, physical characteristics).

Research Report No. 72, Sludge Dewatering Design Manual, by H.W. Campbell, R.J. Rush and R. Tew, Wastewater Technology Centre, Environmental Protection Service, Fisheries and Environment Canada. Project No. 75-3-22. Ottawa, 1978.

A practical procedure for estimating the size and cost of sludge dewatering installation is presented.

Research Report No. 73, Land Disposal of Sewage Sludge, Volume V, by the Department of Land Resource Science, University of Guelph. Project No. 72-5-17. Ottawa, 1978. 203 p.

Describes the results from the fourth year of field runoff studies with fall, winter and spring applied fluid sewage sludges on land cropped with grain corn.

Research Report No. 74, Sludge Incineration and Precipitant Recovery, Volume II, by P.J.A. Fowlie and W.E. Stepko, Wastewater Technology Centre, Environmental Protection Service, Environmental Protection Service, Environment Canada. Project No. 72-3-4. Ottawa, 1978. 35 p.

Multiple hearth incinerator ash produced from sewage sludge was leached at bench scale with various acids and alkalis to recover iron for recycle to the phosphorus removal process. Volume I of this study is published as Research Report No. 31.

Research Report No. 75, Sludge Incineration and Precipitant Recovery, Volume III, by W.H. Schroeder and D.B. Cohen, Wastewater Technology Centre, Environmental Protection Service, Environment Canada. Project No. 72-3-4. Ottawa, 1978. 38 p.

Dewatered sludges from eight treatment plants, four of which used chemicals for phosphorus removal, were studied to determine solids contents and calorific values, and to undergo thermogravimetric analyses. Volumes I and II are published as Research Reports No. 31 and 74.

Research Report No. 76, Sludge Metal Solubilities in Soils, by Melvin D. Webber and Diane G.M. Corneau, Soil Research Institute, Agriculture Canada. Project No. 72-5-18. Ottawa, 1978. 74 p.

Eight anaerobically digested sewage sludges were mixed with six soils and then incubated under several simulated field conditions. The mixtures were extracted to measure Cd, Zn, Cu, Ni, Pb, Co, Cr, Sn, and Mo solubilities.

Research Report No. 77, Water Plant Waste Discharge in the Province of Ontario, by W.R. Hutchison, A.P. Galati and Z.K. Khan, Ontario Ministry of the Environment. Project No. 73-1-31. Ottawa, 1978. 135 p.

105 water treatment plants in Ontario were surveyed to determine effluent discharge characteristics. Chemical and physical tests were performed on wastewaters from 35 plants.

Research Report No. 78, Development of Prediction Models for Chemical Phosphorus Removal, Volume II, by B.P. Prested, E.E. Shannon and P.J. Rush, Wastewater Technology Centre, Environmental Protection Service, Environment Canada. Project No. 73-3-9. Ottawa, 1978. 38 p.

Determined whether the regression equations developed in Phase I to predict chemical requirements for phosphorus removal could be improved by considering both wastewater traits and influent phosphorus levels. Volume I was published as Research Report No. 68.

Research Report No. 79, Chemical Sewage Sludge Disposal on Land (Lysimeter Studies), Volume II, by D.B. Cohen and D.N. Bryant, Wastewater Technology Centre, Environmental Protection Service, Environment Canada. Project No. 72-3-6. Ottawa, 1978. 128 p.

The results of lysimeter studies in which crops were grown on soils treated with anaerobically digested sewage sludges are

presented and compared with field and greenhouse studies. Volume I was published in Research Report No. 67.

Research Report No. 80, Sources of Metals and Metal Levels in Municipal Wastewaters, Elise D. Atkins and John R. Hawley, Pollution Control Branch, Ontario Ministry of Environment. Project No. 75-1-43. Ottawa, 1978. 408 p.

Information was compiled on sources of metals, and municipal wastewater metal levels. The metal contents of many Ontario treatment plant influents, effluents, and sludges are recorded. Product and metal indexes are included for household products.

Research Report No. 81, Evaluation of the Magnitude and Significance of Pollution Loadings from Urban Storm Water Runoff in Ontario, by R.H. Sullivan, W.D. Hurst and T.M. Kipp, American Public Works Association, and J.P. Heaney, W.C. Huber and S. Nix, University of Florida. Project No. 74-8-21. Ottawa, 1978. 183 p.

The U.S. Environmental Protection Agency's STORM program was used on Ontario cities to simulate storm flows and pollution loads. Some considerations were relationships between population and pollution control costs, optimization of storage versus treatment and cost calculations.

Research Report No. 82, Review of Canadian Municipal Urban Drainage Policies and Practices, by Gore and Storrie Limited. Project No. 76-8-40. Ottawa, 1978. 54 p.

Drainage practices are summarized in three parts: 1) design of new sewer systems, 2) abatement of pollution from combined sewer overflows, and 3) field studies. Emphasis is placed on the qualitative effects of drainage on receiving waters and new storm water management techniques.

Research Report No. 83, Summary Report on Phosphorus Removal, by J.D. Archer Ontario Ministry of Environment. Project No. 75-1-42. Ottawa, 1978. 82 p.

The findings of phosphorus removal studies carried out on wastewater treatment plants under the Canada-Ontario Agreement on Great Lakes Water Quality. The objective was to find the most economical and compatible chemical treatment for phosphorus removal.

Research Report No. 84, Treatment of Waste Treatment Plant Effluents by Reverse Osmosis, H. Kirk Johnston and H.S. Lim, Wastewater

Technology Centre, Environmental Protection Service, Environment Canada. Project No. 73-3-14 (Volume II). Ottawa, 1978. 122 p.

The effectiveness of reverse osmosis as an advanced wastewater treatment process for the removal of nutrients, bacteria and various chemical constituents was investigated in laboratory and pilot plant situations.

Research Report No. 85, Removal of Persistant Contaminants from Municipal Effluents by Reverse Osmosis, H. Kirk Johnston and H.S. Lim, Wastewater Technology Centre, Environmental Protection Service, Environment Canada. Project No. 73-3-14 (Volume III). Ottawa, 1978. 66 p.

The effectiveness of reverse osmosis in removing arsenic, selenium, cyanides, nitrilotriacetic acid, phenols, aldrin, DDT, chlordane, endrin, melathion, and parathion from municipal effluents was studied in the laboratory and in a specially equipped mobile pilot plant.

Research Report No. 86, Nitrification-Denitrification of Wastewater Using a Single Sludge System, Volume I, by A.G. Smith, Ontario Ministry of Environment. Project No. 71-1-20. Ottawa, 1978. 75 p.

Full-scale nitrification-denitrification was conducted at the New Market, Ontario, Water Pollution Control Plant (WPCP) to determine the degree of nitrification-denitrification that could be maintained within a system with lime treatment for phosphorus removal.

Research Report No. 87, Microbiological Characteristics of Urban Storm Water Runoffs in Central Ontario, a compilation of three reports prepared for Projects No. 75-3-24, 74-8-25 and 76-8-41. Ottawa, 1978. 30 p., 56 p., 44 p.

Results are presented for three studies conducted to determine: 1) microbiological composition of storm water runoffs at three sites, 2) microbiological characteristics of storm water runoffs at two separate sewers, and 3) the distribution of bacterial pathogens and viruses in storm water runoffs at one site.

Research Report No. 88, Single Sludge Nitrogen Removal Systems, by P.M. Sutton, B.E. Jank and B.A. Monoghan, Wastewater Technology Centre, Environmental Protection Service, Environment Canada. Project No. 75-3-21. Ottawa, 1978. 164 p.

Results of pilot-scale studies of 5 different single sludge process configurations indicated that the critical factor af-

fecting nitrification was the aerobic solids retention time, and that denitrification rates depended on whether the reaction proceeded under non-carbon limiting or carbon limiting conditions.

Research Report No. 89, Storm Water Management for Nepean, Merivale Area, by Gore and Storrie Limited. Project No. 74-8-10. Ottawa, 1979. 71 p.

Storm runoff from the Merivale area of Nepean, Ontario, to the Rideau River was analysed using the Storage, Treatment Overflow Runoff Model (STORM) and the Storm Water Management Model (SWMM) to simulate specific storms. Three storm water management control and treatment alternatives were prepared.

Research Report No. 90, Land Disposal of Sewage Sludge, Volume VI, by the Department of Land Resource Science, University of Guelph. Project No. 72-5-17. Ottawa, 1979. 230 p.

A five-year field runoff study was conducted to determine the maximum rates of sewage sludge application which can be used on agricultural soil without contaminating subsurface and surface water and without reducing the yield or quality of the crops produced. Volumes I, II, III, IV, and V have been published as Research Reports No. 16, 24, 35, 60, and 73.

Research Report No. 91, Impact of Nitrilotriacetic Acid (NTA) on an Activated Sludge Plant, by N. Wei, R. Stickney, P. Crescuolo and B.P. LeClair, Wastewater Technology Centre, Environmental Protection Service, Environment Canada. Project No. 71-3-3. Ottawa, 1979. 37 p.

NTA was added to the Waterdown Water Pollution Control Plant influent to investigate: degradation of NTA, effect of NTA loading and heavy metal removal, and effect of NTA loading on treatment plant operation.

Research Report No. 92, Acute Lethality of Wastewater Disinfection Alternatives to Juvenile Rainbow Trout, by V.W. Cairns and K. Conn, Wastewater Technology Centre, Environmental Protection Service, Environment Canada. Project No. 74-3-18. Ottawa, 1979. 30 p.

The acute lethality of secondary treated wastewater before and after disinfection with chlorine, chlorine dioxide, ozone and ultraviolet light was investigated.

Research Report No. 93, Review of Problems within Combined and Partly Combined Sewer Systems in Ontario, by Gore and Storrie Limited. Project No. 74-8-9. Ottawa, 1979. 160 p.

The objective was to identify, assemble, screen, and assess background information relating to combined and partly combined sewer systems in Ontario. Case histories of six municipalities were used to emphasize problems and solutions.

Research Report No. 94, Municipal Pollutant Loadings to the Great Lakes from Ontario Communities, by D.H. Waller, Nova Scotia Technical College, and Z. Novak, Ontario Ministry of Environment. Project No. 75-8-33. Ottawa 1979. 40 p.

This report updates and extends previous estimates of total annual pollutant loads to the Great Lakes from Ontario Communities. An improved method of estimating combined sewage loads is proposed and evaluated.

Research Report No. 95, Malvern Urban Test Catchment, Volume II, by J. Marsalek, Environmental Management Service, Environment Canada. Project No. 73-3-12. Ottawa, 1979. 66 p.

Continuation of the study reported in Research Report No. 57. Rainfall-runoff events in the Malvern test catchment were monitored and simulation was attempted using the U.S. Environmental Protection Agency's Storm Water Management Model.

Research Report No. 96, Nitrification-Denitrification of Wastewater Using a Single-Sludge System, Volume II, by A.G. Smith, Ontario Ministry of Environment. Project No. 71-1-20. Ottawa, 1979. 67 p.

Continuation of the study reported in Research Report No. 86. Describes a full-scale evaluation of the split-return mode for nitrification-denitrification of a combined domestic/industrial wastewater.

Research Report No. 97, Storm Water Management Model Verification Study, by M.M. Dillon Ltd. Project No. 74-8-5. Ottawa, 1979. 106 p.

Describes a study to calibrate and verify the U.S. Environmental Protection Agency's Storm Water Management Model for an urban catchment area in North York, Toronto.

Research Report No. 98, Land Disposal of Sewage Sludge, Volume VII, by the Department of Land Resource Science, University of Guelph. Project No. 72-5-17. Ottawa, 1980. 17 p.

cf. Research Reports No. 16, 24, 35, 60, 73 and 90. This project has been continued under the Ontario Lottery Program.

Research Report No. 99, Storm Water Management Model Verification - Hamilton Test Catchment, by Gore and Storrie Ltd. Project No. 74-8-6. Ottawa, 1980. 93 p.

The U.S. Environmental Protection Agency's Storm Water Management Model was calibrated and verified for a residential test catchment served by a combined sewer system.

Research Report No. 100, Brucewood Urban Test Catchment, by James F. MacLaren Ltd Project No. 77-8-43 (combined report on Projects No. 73-3-12+, 74-8-4 and 75-8-34). Ottawa, 1980. 60 p.

Rainfall and runoff data for the residential subdivision of Brucewood, Toronto, were collected and used to calibrate the U.S. Environmental Protection Agency's Storm Water Management Model for simulation of rainfall and snowmelt events.

Research Report No. 101, Report of the Urban Drainage Subcommittee Projects Conducted 1972-1978. Ottawa 1980. 134 p.

Describes projects conducted for the abatement of pollution from storm and combined sewers and urban drainage under the administration of the Urban Drainage Subcommittee of the Technical Committee of the Canada-Ontario Agreement on Great Lakes Water Quality.

Research Report No. 102, Proposed Model Policies for Urban Drainage Management, Report of the Urban Drainage Policy Committee. Ottawa, 1980. 51 p.

Describes a new approach to urban drainage planning and engineering, incorporating broader use of municipal planning mechanisms and recently developed technology.

Research Report No. 103, Full-Scale Evaluation of High-Rate Screening Devices for Treatment of Sanitary Sewage By-pass Flow, by H. Kronis and F. Tonelli, Pollution Control Branch, Ontario Ministry of Environment. Project No. 72-1-22. Ottawa, 1980. 145 p.

The performance and cost of four full-sized high-rate screening devices were evaluated for the treatment of wet weather raw sewage flows.

Research Report No. 104, Manual of Practice for Urban Drainage, Urban Drainage Manual Working Committee. Project No. 76-8-38. Ottawa, 1980. 326 p.

State-of-the-art concepts, analytical methods and technology related to the solution of urban drainage problems are presented for the information of consultants, planners, developers, and municipal officials.

Research Report No. 105, Unslaked Lime - Its Direct Use in Phosphorus Removal Processes, Wastewater Technology Centre, Environmental Protection Service, Environment Canada. Project No. 71-3-1. Ottawa, 1980. 24 p.

Describes pilot plant experiments using a low lime (pH 9.5) and a high lime (pH 11) treatment level to evaluate the effectiveness of dry quicklime for phosphorus removal.

Research Report No. 106, Evaluation of Wastewater Disinfection Alternatives, by F.A. Tonelli and K.W.A. Ho, Pollution Control Branch, Ontario Ministry of Environment, and N.W. Schmidtke, Wastewater Technology Centre, Environment Canada. Projects No. 74-1-33 and 74-3-17. Ottawa, 1981. 181 p.

Comparison of chlorine, chlorine dioxide and ozone as terminal disinfectants for secondary effluents from municipal water pollution control plants.

Research Report No. 107, Sludge Incineration and Precipitant Recovery, Volume IV, Pilot-scale multiple-hearth furnace investigations, by W.H. Schroeder, P.J. Crescuolo, H.W. Campbell and D.B. Cohen, Wastewater Technology Centre, Environmental Protection Service, Environment Canada. Project No. 72-3-4. Ottawa, 1981. 55 p.

Sludge was incinerated in a multiple-hearth furnace to determine optimum temperature, loading rate and centre shaft speed, and examine the fate of selected elements.

Research Report No. 108, Land Disposal of Sewage Sludge, Volume VIII, by the Department of Land Resource Science, University of Guelph. Project No. 72-5-17. Ottawa, 1981. 17 p.

Summarizes results obtained during the seventh year (April 1979 - March 1980) of an eight-year research program to determine the maximum rates of sewage sludge application that can be used safely on agricultural soil. Volumes I, II, III, IV, V, VI and VII have been published as Research Reports No. 16, 24, 35, 60, 73 and 90.

Research Report No. 109, Assessment of Heavy Metals and PCBs at Selected Sludge Application Sites in Ontario, by M.D. Webber, Wastewater Technology Centre, Environment Canada, H.D. Monteith, Canviro Consultants Ltd., and Diane G.M. Corneau, Land Research Institute, Agriculture Canada. Project No. 76-3-26. Ottawa, 1981. 27 p.

Ten sludge application sites representing different locations, soil types, sludging histories, and metal and PCB concentra tions in sludges applied were sampled to determine background levels of heavy metals and PCBs.

Research Report No. 110, Parasites and the Land Application of Sewage Sludge, by H.J. Graham, Pollution Control Branch, Ontario Ministry of Environment. Project No. 74-1-41. Ottawa, 1981. 84 p.

Based on a study of the incidence of parasites in Ontario sludges and the length of time that these parasites remain viable on farmland, recommendations are provided to minimize the risk of infection from sludge during and after application.

Research Report No. 111, Energy Losses at Straight Flow-Through Sewer Junctions, by J. Marsalek, National Water Research Institute, Enivironment Canada. Project No. 74-8-22. Ottawa, 1981. 29 p.

Energy losses at manholes where the pipe does not change direction were measured in a scale model with four different invert geometries.

SEWAGE COLLECTION AND TREATMENT (SCAT) RESEARCH REPORTS

RAPPORTS DE RECHERCHE DE LA SÉRIE SCAT (LA COLLECTE ET LE TRAITEMENT DES EAUX USÉES)

SCAT-1, Evaluation of Stormwater Impoundments in Winnipeg, by G.M. Chambers and C. Tottle, City of Winnipeg. Ottawa, 1979. 80 p.

Stormwater impoundments in Winnipeg were examined and compared to conventional all-conduit land drainage systems.

SCAT-1F, Évaluation des bassins de retenue d'eaux pluviales à Winnipeg, par G.M. Chambers et C. Tottle, Ville de Winnipeg. Ottawa, 1980. 85 p.

Les bassins de retenue d'eaux pluviales de Winnipeg sont comparés aux réseaux classiques de canalisation servant au drainage des terres.

SCAT-2*, Pilot Plant Studies of Rotating Biological Contactors Treating Municipal Wastewater, K.L. Murphy and R.W. Wilson, International Environmental Consultants Ltd., Ottawa, 1980. 117 p.

Treated effluent containing filtrable BOD_5 concentrations consistently less than 10 mg/L was produced in this 12-month pilot program.

SCAT-3*, Stormwater Management Technology Systems Demonstration in the City of St. Thomas, James F. MacLaren Ltd. Ottawa, 1980. 212 p.

Computer analysis and modelling techniques were used to evaluate solutions to stormwater flooding and pollution problems in St. Thomas.

SCAT-4*, Effect of Flow Equalization on Water Pollution Control Plant Performance, Dearborn Environmental Consulting Services. Ottawa, 1980. 61 p.

Evaluates the feasibility of using flow equalization to reduce the overall cost of municipal wastewater treatment through comparison of two identical systems, one operating with equalized flow and one without equalized flow.

SCAT-5*, Extended Aeration Package Plant Performance Evaluation, D. Thirumurthi, Nova Scotia Technical College. Ottawa, 1981. 53 p.

Evaluates performance of 20 extended aeration activated sludge package plants of design capacities from 8 to 454 m^3/d.

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* La version française est présentement en préparation.

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